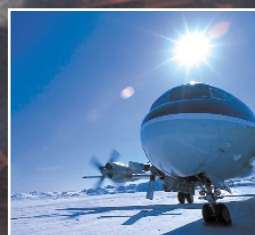


PC PILOT

The Magazine for Flight Simulation in association with www.simflight.com

**EXCLUSIVE
FEATURES**



The magic of
the Electra



Concorde Pilot
talks supersonic
sims

Flight Simulator 2000 as real as it gets? *The most detailed look yet*

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NEW YORK NEW YORK SO GOOD YOU LANDED TWICE.

NEW Microsoft® Flight Simulator 2000 Professional Edition now includes the Mach 2 Concorde as well as 12 cities displayed in intricate 3D detail. So good, you'll want to land again and again... It's as real as it gets!

New for 2000:

3D terrain in 16-bit colour
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12 aircraft
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Boeing 777-300
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Meet the "Top Gun" of commercial pilots. British Airways Concorde pilot, Mike Bannister, talks of supersonic flight simulation.

by Mike Clark



Come Fly With Us...

The Crew

Welcome to the first issue of *PC Pilot* – the world's most exciting flight simulation magazine.

PC flight simulation has come a long way since the days of simple wire-frame graphics. In fact, flight simulation, once no more than a simple "game" has far surpassed most of our hopes and dreams. It is now recognised by professional training establishments. Airline captains, air traffic controllers and professional flight instructors class PC-based flight simulation as an essential training tool in learning the basic principals of real flight and navigation.



It seems that over the years the mainstream magazine publishers have ignored our interests. Strange, given that there are well over 5 million serious flight simulation enthusiasts worldwide and that Microsoft Flight Simulator over the past 15 years or so has consistently been one of the most successful selling PC programs.

A lot of work and careful thought has gone into this first issue of PC Pilot – nearly a year's worth in fact! Throughout, we have consistently put the reader first in our thinking and content. So many times we browsed through magazines and thought, "this tells us absolutely nothing". We have taken a no-nonsense approach, which we hope you like. We have included information on areas often overlooked in reviews, such as frame rates and what kind of PC you really need to run a featured product.

Perhaps more than anything we want this to be an interactive magazine that you can also participate in. We would love to hear what you want to see and to hear of your comments, good or bad. We can promise we will listen and react. Send us your letters, views, ideas. Do you have a favourite virtual flight that you want to share with others? Do you want us to plug your Virtual Airline or user group? A particular problem with a recalcitrant software house you want us to help with? Or a great flying tip? Let us know.

The only thing we will not be able to do is to provide technical support – sorry we're just too busy bringing you the best magazine around!

Finally a big thank you to all who helped put this issue together and of course to you, the reader. Take a look over The Crew we have on board and you'll realise too what a great team we have.

Fly high and safe landings.

Mike Clark
Editor PC Pilot.

Trevor Morson

Location: Chicago, USA (originally from Liverpool!!)
Background: Manager for AT&T and passion for flight simulation and the DC-3.
Notes: Part owner of a DC-3 (N763A) Ozark Airlines, operated by the Prairie Aviation Museum, Illinois. Author and developer of 'DC-3' - an expansion pack for Microsoft Flight Simulator 98. Trevor hosted a popular flight simulation forum at simflight.com and has written many editorials and reviews for flight sim products and general aviation.

Associated Web Site: The largest DC-3 site on the Internet at www.simflight.com/dc3

Angelo Moneta

Location: Italy
Background: Air Traffic Controller and commercial and freeware developer.
Notes: You will find Angelo's fingerprints on many Flight Simulator expansions - both commercial and freeware - including the Classic Wings series of add-ons by the VIP group. Angelo is one of the founder members of FIVS (Federazione Italiana Volo Simulato) and is well respected in the industry.

Associated Web Site: A popular site, with many great freeware files at www.intercity.it/moneta

Chuck Dome

Location: USA
Background: Teacher and flight simulation expert since Microsoft Flight Simulator v3.0!
Notes: Chuck Dome is a legend. He has been around since the beginning and is known around the world as a leading figure in Flight Simulation. Chuck has created aircraft, scenery, panels and utilities for the flight simulation industry since 1990. He has also had many articles published in "other" flight simulation publications.

Kenji Takeda

Location: Southampton, United Kingdom
Background: Holds doctorate and is researcher in the field of aeronautical design.
Notes: Kenji is an experienced computer journalist who has worked for such magazines as PC Gaming World, Computer Life and PC Review and is also a contributor to Gamespot UK. He holds a Master of Engineering degree in Aeronautics and Astronautics, a PhD in Aerodynamics and is a professional member of the American Institute of Aeronautics and Astronautics (www.aiaa.org). When he's not flying for PC Pilot, he is busy performing research in aeroacoustics, developing techniques to model aerodynamic noise and finding ways of reducing it to help make our airports quieter in the future.

Associated Web Site: www.soton.ac.uk/~ktakeda

Greg Gott

Location: New Hampshire, USA
Background: The Hardware Eagle! Specialist in hardware solutions for all types of flight simulation.
Notes: Greg has held a private pilot's license for 11 years and enjoys cruising around the New England countryside in Skyhawks and Archers. Greg is a genius with hardware and knows many different types of system... being one of the first "overclockers". Some of his much-praised articles can be found at www.simflight.com.

Alexander Lawrence

Location: Israel
Background: Flight Simulator expansion developer and reviewer.
Notes: Alex is a popular and experienced member of the flight simulation community having worked for some top web sites. Alex combines his time at PC Pilot with that as chief reviewer for www.simflight.com. He is a flight simulation designer and renowned for his freeware panels for Microsoft Flight Simulator.

Associated Web Site: Original freeware panels for Microsoft Flight Simulator at www.virtual.com-web.com

Marc Suxdorf

Location: Hamburg, Germany
Background: Designer of Microsoft Flight Simulator instruments and panels as well as an interior and corporate designer in his other job!
Notes: A private pilot himself, Marc is well-liked in the industry. He has written items for www.flightsim.com and is known for his great panels and instruments.

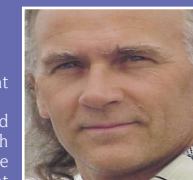
Brian McWilliams

Location: Florida, USA
Background: Programmer of popular Airport and Scenery Designer and FSText.
Notes: Brian started programming when he was 10 using QuickBASIC and C++. He currently uses Borland C++ Builder and Visual Basic 5.0 Pro. Brian has programmed many scenery and aircraft expansions for Microsoft's Flight Simulator.

Bill Stack

Location: Tennessee, USA
Background: Management consultant, professional author and speaker. Writes tutorials and training books for flight simulation.
Notes: Bill Stack has written numerous books and articles about business, management and marketing and has trained thousands of business and government professionals. With his flight simulation books, he applies his training background to help fellow flight simmers reach their greatest potential in flight skills.

Associated Web Site: www.topskills.com



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PC PILOT

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NEWS

FLIGHT SIMULATOR TO FLY ON MICROSOFT CONSOLE?

Rumours have been widely circulating in the industry press of a new Microsoft console to take on the might of Sony and Nintendo. Although Microsoft have made no official announcement, Microsoft were discussing

details of the console with key figures in the games publishing world. Apparently the console will be based on PC technology (possibly in partnership with Dell or Gateway) with a 500Mhz processor, DVD, nVidia 3D

Microsoft

graphics accelerator and Internet capable.

Price is speculated at somewhere around £200 and launch could be early next Christmas. A system of such power and price could certainly open the skies of flight simulation to many more users. ■

PAPA TANGO FLY LAUDA INTO AUSTRIA...

Developers, Papa Tango have announced two new releases for any Austria-loving fans of Flight Simulator 98.

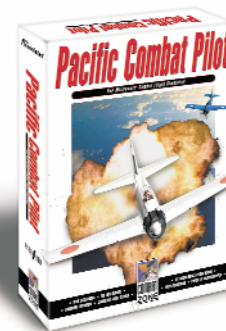
Air Lauda 425 has the attractive proposition of seating you next to Air Lauda's youngest female Captain-in-Command. The product promises live ATC (air traffic control) as you fly a CRJ-100 from Vienna to Nice on flight NG425. Nice!

Neatly released around the same time is Austria Professional Scenery, with rather lovely looking scenery of the Austrian Alps and airports. Billed as "The Most Spectacular Upgrade Ever Conceived", it is certainly pretty and no doubt worth looking at if you like flying in this part of Europe. ■

Developer: Papa Tango
Website: www.papatango.com
Release: Imminent
Price: £34.95 each.



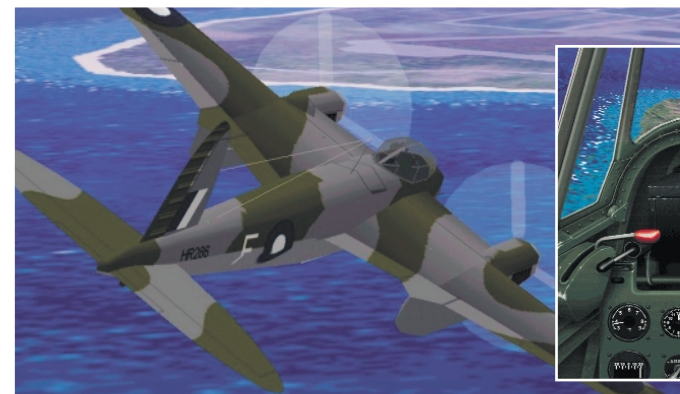
TORA, TORA, TORA...



New Scenery, Aircraft and Missions are expected from Pacific Combat Pilot the latest Combat Flight Simulator release from The Associates.

Includes 27 new aircraft from the Pacific arena during the Second World War, including old favourites and unusual Japanese planes. Photo realistic scenery of the Northwest Pacific will be included covering Guam, Saipan, Tinian, Rota and others in the northern Marianas. Other special 3D objects will be included also like Japanese and American aircraft carriers. ■

Publisher: The Associates
Web Site: www.flightsim.co.uk
Release date: October 1999
Price: £24.99



USE FLIGHT SIMULATOR 98 ADD-ONS IN COMBAT FLIGHT SIMULATOR

COMBAT EXPANSION PACK
directflight

A useful new utility has been announced that now lets you use Flight Simulator 98 add-ons in Combat Flight Simulator.

Combat Expansion Pack enables you to save and select flight situations, automatically import flights from Flight Simulator 98, run

adventures and automatically convert Flight Simulator's advanced view options. You will be able to adjust visibility effects with 11 variable settings not previously available in Combat Flight Simulator. Also the new utility means that Combat Flight Simulator users can use 3rd party weather products such as RealWeather 5,

FSClouds & Textures, Flight Director 98/99 and others. ■

Publisher: Horizon Software Publishing
Web Site: www.fsaddon.com
Release Date: (Available now as shareware Download Only)
Price: \$14.99 (UK price may vary on current exchange rates)

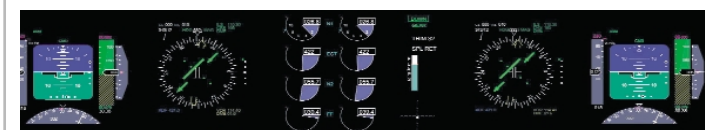
SMASHING GLASS COCKPITS!

PFD
PROFESSIONAL FLIGHT DISPLAYS

Professional Flight Displays, Inc. (PFD) has announced the release of glass cockpit instruments for use with Flight Simulator 98. The product is in modular format so that people have the choice of purchasing the whole system or additional

components later when they need them. The "Glass Cockpit" currently consists of a Primary Flight Display (PFD) with optional Flight Director, a Navigation Display (moving map unit), and 2, 3 or 4-engine CRT display. The Glass Cockpit is available now. ■

Developer Professional Flight Displays
Website: www.schiratti.com/pfd.html
Release Date: Out Now!
Price: Start from \$48.00 - \$169.00 (UK prices may vary depending on exchange rates)



F/A-18E SUPER HORNET... IT'S A BEAST!



We recently saw a BETA demonstration of Digital Integration's latest development - a stunning update to F16 Fighting Falcon. The F/A-18E Super Hornet (a US Navy Strike Fighter) looks as though it

will maintain the tradition of DI's professional excellence. We will just have to cover this in more detail in the next issue of PC Pilot just had to cover in our first issue - it amazed us with its sheer

professional presentation and serious attitude for a combat sim. ■

Developer: Digital Integration
Website: www.superhornet.com
Release Date: November 99

FLY THAT TIGER...



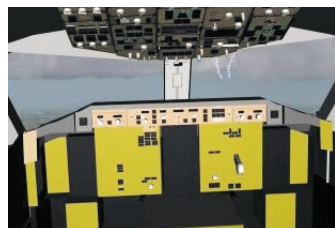
Combat Flight Simulator has proven to be a successful platform for Microsoft. Combat Flight Simulator. It combines an exciting military engine for the gamer and an "open system" with plenty of opportunity for flexibility and expansion. Following the



launch of Abacus's best selling Pacific Theatre and Battle For Midway, here's another add-on for Microsoft Combat Flight Simulator. Wings Over China includes 12 famous U.S. and Japanese planes used by the famed "A.V.G. Flying Tigers" in the

Chinese theatre during World War II. Scenery master Tim Dickens has designed landscapes of Western China and Southeast Asia including the formidable Himalayas - using elevated mesh terrain techniques. The air battles to keep China from the hands of the Japanese were many. The strategy to keep the supply routes open to the Allies produced numerous attacks and defences. Wings Over China recreates 20 of these famous missions. Looks to be an exciting release for Combat Flight Simulator fans. ■

FIRST ADD-ONS ANNOUNCED FOR FLY!



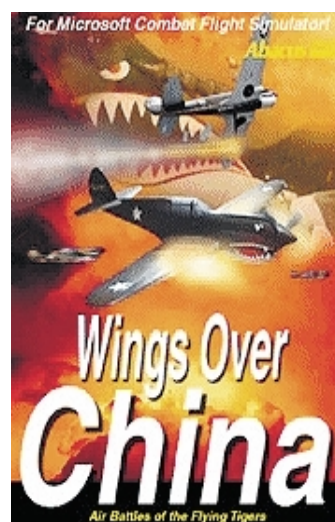
Publisher, Precision Manuals, who are known for their manuals for 747-400 Precision Simulator and Microsoft Flight Simulator 98, have announced the first commercial add-ons for Fly!



The new products will highlight the 757/767 and 777 transport aircraft. Featuring full working cockpits, highly detailed external aircraft models, accurate systems models, flight models and the appropriate flight manual documentation these two products are sure to be a hit with Fly! pilots craving the heavy metal!

No price or distributor has been announced yet. ■

Developer: Precision Manuals
Web Site: www.precisionmanuals.com



Publisher: Abacus
Web Site: www.abacuspub.com
Release date: October 1999
Price: £24.95

NEW YOKES HAVE LANDED

CH Products, the American sticks and yokes company have announced that they have officially landed in the UK and joined forces with new company Virtual Reality Ltd. who are based at Bristol International Airport.

First in is a new USB version of the CH Products Flight Sim Yoke. As anyone who has used a USB (Universal Serial Bus) peripheral will tell you, the port allows very easy and automatic installation and connection of new devices without even switching off the PC. The new USB Yoke is supported by every simulator in production and can connect to any new PC on the market. It should be a welcome addition for those considering such an investment.

Other new USB peripherals from CH are the F16 Combat Stick USB that works

CH PRODUCTS

with most 3D combat simulations, USB Pro Throttle and USB Pedals. All feature Window 98/2000 support are expected by Christmas. No confirmation on pricing yet. ■

Manufacturer: CH Products
Distributor: Virtual Reality Ltd
Website: www.chproducts.com



HARDWARE NEWS

NEW nVIDIA CHIP?



The TNT2, in many people's eyes, was the supreme video chip when it and the Voodoo3 first launched. NVidia has leaked some data on its next chip, the NV10. Briefly, this chip will be capable of off-loading graphical computations that normally are handled by the CPU, thereby freeing the PC's processor to handle other tasks. This will greatly reduce the CPU dependency factor, thus allowing slower PC systems to benefit from faster

graphics. Though not officially announced as we went to press, you can extract some information from the interview with Nick Triantos from Nvidia at <http://www.powergamerz.com>. ■

Manufacturer: Nvidia;
NV10 chip release:
October 1999
Price: unknown
Website: www.nvidia.com

MORE MAGIC FROM VOODOO

The Voodoo3 has brought 3dfx more success, despite criticism from some hardware aficionados. However, for PC pilots, does the lack of AGP texturing and only 16 MB of memory matter when running Flight Simulator 98 or Combat Flight Simulator? Check out our feature review for some answers.

3dfx are claiming to trounce the competition with their new technology - the Voodoo4, featuring the 'Napalm' chip, will include 3dfx's "T-Buffer" technology. According to 3dfx, this new technology will increase the visual realism in 3D acceleration through techniques known as Anti-Aliasing, Motion Blur, and Depth of Field. The same

techniques are used in films and professional photography, making T-Buffer the proverbial bridge that could span the void between current 3D visuals and true photo-realism.

Meanwhile, 3dfx has announced that it has reduced the price of its best-selling Voodoo3 2000 and Voodoo3 3000 boards - with immediate effect. The Voodoo3 2000, which is available in both PCI and AGP versions, is now just £79.00, while the Voodoo3 3000 (reviewed this issue) is



now £129.00 - a reduction of £20 on the previous RRP. ■

Manufacturer: 3dfx
Voodoo4 estimated release date:
October 1999
Website: www.3dfx.com

TWO UP FOR MATROX

The company known mostly for their superb 2D imagery has released what many say is the video card to own. One brightly shining feature of the G400 and G400 MAX is the Dual-Head display, allowing the user two monitor operation. Until PC Pilot is able to procure one of these gems, we'll hold off on any speculations about its performance and visual beauty - though we have seen the two-monitor system in operation and it looks ideal for flight simulation. For example, displaying the cockpit panel on an older 2nd monitor, whilst freeing more space for the out-of-the-window view on your main screen. ■

Manufacturer: Matrox
Website: www.matrox.com

Microsoft's Flight Simulator 2000

Following on from the success of Flight Simulator 98, certainly the best selling flight simulation ever produced, Flight Simulator 2000 (FS2K) is the latest version of Microsoft's highly realistic and graphically advanced program.

Microsoft have decided to follow the strategy taken with their business products, such as Office, with the release of two versions of Flight Simulator 2000 – a Standard Edition and a more expensive Professional Edition with more aircraft and features. We've based our preview on the Professional Edition as this looks like the one to go for if you are serious about flying on your PC, despite the extra cost.

PREVIEW			
Publisher:	Microsoft	Price:	£49.99
Web:	www.microsoft.com		for Standard Edition.
Developer:	Microsoft	£69.99	for Professional Edition.
No of Players:	1-8		
Difficulty:	Moderate-Difficult		
Owners of previous versions of Microsoft Flight Simulator will be entitled to £10.00 'cash-back' from Microsoft (£15 for Professional Edition).		Release Date:	12th November 1999 (UK)

The planes, such as this 737, sport new liveries



Microsoft claims to be working closer than ever before with leaders of the aviation industry, such as Mike Bannister, chief Concorde pilot of British Airways (see our interview later in this issue), manufactures, pilot training organisations, data suppliers, and flight instructors to make Flight Simulator 2000, "as real as it gets".

At the time we went to press, Microsoft had yet to make a beta available to anyone outside of the development team. We have based our preview on various in-depth testing at this summer's Oshkosh airshow in the United States and long discussions with Bruce Williams, Microsoft's project manager for simulations. It seems Microsoft either has a lot of catching up to do to meet their scheduled mid-November release or is being overly nervous to possible early criticism of unfinished code. Certainly there is much speculation as to what kind of hardware you will need to run FS2K with good frame rates and detail levels – our latest look in early September showed a rate of less than 10 frames per second, on an unknown Pentium III and 3dfx card and with unfinished scenery!

New Aircraft, Cockpit and Panels.

Although FS2K Professional Edition has a total of 12 aircraft, 8 are favourites from previous versions. These have been significantly improved upon their predecessors in their 3D design, overall flight performance and realism.

As if you hadn't guessed yet, Concorde has been added and appears to be the aeroplane used to attract the mass market. It is this aircraft that is displayed on the box and within advertisements for FS2K. It is also seen as the program's opening logo during loading. After all, who hasn't wanted to fly it? We studied the aircraft from all angles inside and out and it is certainly fine a rendition. In fact, all the aircraft display an intense three-dimensional quality, an area Microsoft has always executed well throughout the life of Flight Simulator.

*It is possible to fly
supersonic ...*

It is possible to fly supersonic (from zero airspeed to Mach 2) with an FS2K Concorde. But we didn't get as far as breaking the sound barrier to see if we could hear a sonic boom during flight! Concorde in FS2K seems complex and we would have needed to study the flight training manuals (which Microsoft says will be included), to get to grips with the speed and handling. Contrails (vapour trails) were being produced at high altitudes – a pleasant surprise.

Concorde, like all the aircraft within FS2K, have what is known as moving parts. For instance, when retracting the landing gear, you will see (from spot view mode) everything smoothly animated, as well as

Some of the aircraft look amazing. The Bell Ranger is a dramatic improvement.



Can't wait?

For people desperate to see what some of the new aircraft look like before FS2000 is released, you can download video clips (AVI's) from Microsoft's website at www.microsoft.com/games/fs2000/



Boeing 777-300



Schweitzer 2-32 Sailplane



Bell 206 Helicopter



Cessna 182RG

As Real As It Gets?



Now you see me! Each aircraft now has clear cockpit glass and handsome pilots. Shown here are the Learjet 45 (below), Beech King Air (bottom left) and Cessna 182S (bottom right).



ailerons and flaps and so on. Overall, Concorde looks to be an aircraft that enthusiast's will want to fly. That is, when the intimidation factor is overcome. This bird won't be an easy one, but fun learning to fly all the same.

The cockpit panel used for Concorde was terrific. It uses analogue type instrument gauges, complete engine avionics and ancillary systems. We saw over a hundred instrument gauges and all of them were fully functional within the cockpit.

What other simulation has a Concorde and a Glider, together, in the same package?

The Boeing 777-300 is another new addition that looks very interesting and quite realistic. In this early version of FS2K, it had a generic livery that we hope is improved before release – it made the aircraft look like it needed a wash! FS2K is probably the only simulator, we believe, that has the ability to render huge airliners with reasonably realistic flight dynamics.

The cockpit panel for this aircraft looked incomplete. Maybe Microsoft is saving the

best until we see the final version. It did, however, contain new CRT (cathode ray tube) gauges (instruments that look like a digital 'moving map') that were not seen in previous releases. Overall, the 777-300 looks very promising, but will be another that needs to be studied carefully when reading training manuals.

The Raytheon/Beech King Air 350 is a treat to see from spot view mode with clear cockpit glass and 3D pilots sitting inside. The prop spinning effects were absolutely superb in graphic design and much improved.

The cockpit panel and layout was outstanding in that it was a clear rendition of the real thing - everything was where it should be. FS2K uses a new technique called Alpha Blending. This has the ability to make 8-bit colours look like 24-bit colours. So what? For example, the "AI" (Attitude Indicator or the Horizon Indicator) used to look flat, but now you can clearly see that the ball within the gauge looks round. The Alpha Blending enhances the colours to give what you are looking at a sense of depth or 3D. This effect has also been applied to give the impression of real glass reflecting off the

Panels, Panels, Panels...



Boeing 777-300



Cessna Skylane with GPS



Cessna Skylane IFR



Concorde Panel



Additional Concorde panel view



King Air Panel



Mooney VFR Panel

gauges too. New instruments have been added such as cowl flaps, trim wheels, extra navigational lighting switches and fuel tank switches. Improvements have also been made to the radio stacks.

The Mooney Bravo, quickly became our favourite. This is a beautiful piece of 3D modelling from the outside. The colours used for the livery seemed to be perfect for an aircraft of this type. To our surprise, there are two types available - IFR (Instrument Flight Rules), and VFR (Visual Flight Rules) versions with different panel layouts.

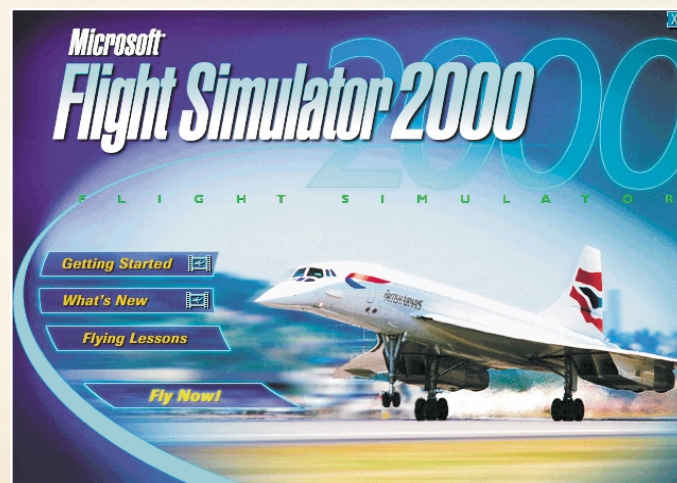
The Mooney Bravo, quickly became our favourite.

The IFR panel covers the entire screen, leaving a small rectangular box in the very top left corner for seeing the outside scenery. Those of you familiar with the FAA approved "Elite" flight simulator, whereby you can use 10 hours on this sim toward your PPL (Private Pilots License), will understand that FS2K's IFR Mooney cockpit panel graphically looks better.

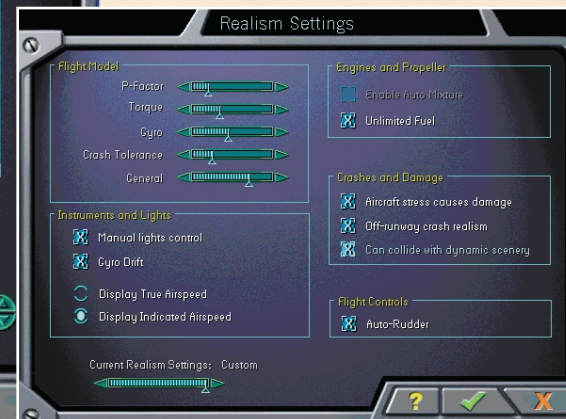
The VFR panel took up just over half the screen where more space was given for viewing the scenery. The VFR panel was also a treat to look at by way of graphic design and instrument gauges.

FS2K aircraft give you the ability to move around within the cockpit and view at all angles such as left, right, rear left, rear right and behind. The visuals here are photo-realistic looking and again it was no disappointment scrolling around the interior of the aircraft. The IFR aspect of FS2K's aircraft looks to be very exciting indeed and learning to fly real aircraft on a PC first looks more feasible than ever before.

Sounds of the aircraft's engines from inside and outside are in stereo as in previous releases. Although Microsoft advertises the inclusion of improved aircraft sounds, at this early stage in



The general welcome and interface screens have been given a welcome facelift and are slightly easier to use.



Microsoft's minimum system requirements for Flight Simulator 2000 Professional Edition:

- Multimedia PC with a Pentium 166 or faster microprocessor
- Microsoft Windows® 95 or Windows 98 operating system or Windows NT® Workstation operating system version 4.0 with Service Pack 3
- 32MB of RAM for Windows 95 or Windows 98, 64 MB recommended; 64 MB of Ram for Windows NT 4.0
- 350 MB of available hard-disk space; 365 recommended
- 50 MB of available hard disk space for swap file
- Quad-speed or higher CD-Rom drive
- Super VGA, 16-bit color monitor required
- Microsoft Mouse or compatible pointing device, joystick or flight yoke recommended
- Microsoft DirectSound® 6.0 API-compatible sound card with speakers or headphones for audio

Optional

- 3-D graphics accelerator card or chip compatible with Microsoft Direct3D® version 6.0 API
- KNI or 3DNow instruction set microprocessor
- Force Feedback peripherals compatible with Microsoft DirectX® 6.0 API
- Internet features require Internet access.

Requirements for multiplayer play:

- 28.8 kbps or faster modem, local area network with TCP/IP or IPX protocol, or null-modem cable required for connection to other systems.
- To play on the Internet Gaming Zone (zone.com), you need to have one of the following Web browsers: Microsoft Internet Explorer 3.02 or later or Netscape Communicator 4.0 or later

development we did not notice anything that different, only that they sounded realistic. It is possible Microsoft are referring to the inclusion of start up and shut down sounds of the engines that have not been implemented yet.

The Original Flyers Now Updated

There are 8 other aircraft included with FS2K that over the years have become favourites in the Flight Simulator series.

All these aircraft are included and have a more realistic and smoother look to them. If you look very closely, you can see actual rivets all over the aircraft and the wiring



Flight Simulator 2000 Standard Edition Features

- > New 16 bit color 3D scenery graphics system with true elevation.
- > New Aircraft added, The Mach 2 Concorde and the Boeing 777-300. (total of 10 aircraft).
- > New instrument panels, virtual cockpits and exterior 3D models. More detailed systems
- > Improved sounds.
- > Ability to change the amount of fuel in each tank to change your aircraft's weight, performance, and range.
- > Ability to set the aircraft realism using sliders, or manually select specific realism options that affect the:
 - Aircraft's flight characteristics
 - Instruments and lights
 - Engines and propeller
 - Crashes and damage
 - Flight controls
- > Ability to set failures for instruments, (randomly or for a specific Instrument.)
- > More than 20,000 airports worldwide. An increase of 17,000 from FS98
- > New cities and 3D objects in unprecedented detail.
- > Includes six new/improved cities: London, Paris, New York, Los Angeles, San Francisco, and Chicago.
- > New custom 3D objects, including buildings, vehicles, ships, towers etc..
- > Real-world weather provided by Jeppesen. Can also be downloaded off the Web.
- > New Global Positioning System Navigation
- > Moving map
- > Basic GPS
- > Flight planning
- > FS98 Compatible Aircraft, Scenery, and Adventures

under the landing gear struts. The windows are transparent and the pilots sitting at the controls can be seen three dimensionally. The props are rendered better and each of the original versions has now been upgraded with new liveries. The interior views, like the new additional aircraft, are improved through all angles. Included with most aircraft cockpit panels is a basic GPS (Global Positioning System). This provides point-to-point navigation with constant positioning updates on a moving map display, ground speed, course to next waypoint and other useful information.

The Extra 300S again sports the colour scheme of aerobatic champion Patty Wagstaff.

Propeller Aircraft

The fixed-gear Cessna 182 found in Flight Simulator 98 has been updated to the modern 182S. Its sister, the retractable-gear Cessna Skylark RG is also included. Although rendered in the same style as previously, both have enhanced 3D modelling all round.

The 206B Bell Jet Ranger III helicopter has, like the Cessna, been improved in overall design. Is it any easier to fly? The main complaint of the original Jet Ranger was that it was not realistic enough. At the time of original development it's flight model it was tuned down for ease of flying. Nonetheless it was too difficult for many to hover or land and some people demanded an improvement. Microsoft was quoted at the time as saying, "If it were too realistic, no one would be able to fly it correctly and they would soon get bored". We did not test fly it in FS2K but we do know that the Flight Simulator team are aware that improvements need to be made and we hope to see a vast difference upon release.

The Sopwith Camel... boy oh boy, this has improved ten fold! It now sports a new



Detailing inside and out has kept pace with the competition. New cockpit interiors (such as the 737, left) add more atmosphere while the gear (on the 777, above) suspension even compresses on touchdown!

military livery that gives it a great 3D feel. This aircraft has been seen in 3 previous versions and although sometimes neglected by users, it is a popular and realistic model. The flight dynamics in the past were excellent and so we see no problems in FS2K flying this famous bi-plane from the WW1 era. The open cockpit has a 3D-rendered pilot sitting at the controls. The panel has also been improved with a new enhanced bitmap graphics and new gauges.

The Extra 300S again sports the colour scheme of aerobatic champion Patty

Wagstaff. This has been improved both inside and out. The cockpit panel has new instrument gauges. With the new improved FS2K graphics system came some subtle new touches. For example, new enhanced smoke trails. They twist and turn in the air during flight. It strikes us that Microsoft use a famous name like Patty Wagstaff simply as an advertising gimmick, although Microsoft do claim that Patty was consulted about flight dynamics and helped on the flight training manuals for the simulator. These days, she now flies an Extra 330S, which is an improved version of the 300S. This enables her to perform even more astounding aerobatics at airshows across the United States. We imagine that the 330S was not included in FS2K because of timing issues in having to re-work the flight model from scratch.

The Jets

The Learjet 45 business jet also seems generally improved, both inside and out. This is a favourite of many flight simmers and we're sure that the updated version will have been fine-tuned for improved realism.

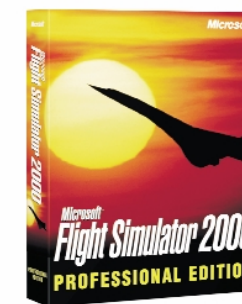
The Boeing 737-400 has a new livery and added enhancements to the cockpit panel. We did not get a chance to extensively test the flight dynamics. Microsoft claim that the panel will be updated and the autopilot and throttles will be improved.

The Schweizer 2-32 Sailplane... Sorry folks, we could never understand why this glider, or any glider for that matter, was included. Some of us have never flown this type in previous releases and doubt we will in FS2K. However, we did look at it parked at the runway from spot view mode and it has improved a little in looks. What other simulation has Concorde and a glider, together, in the same package?

Scenery and Weather

FS2K has a 16-bit graphics engine that gives an improved look to the overall scenery. It has worldwide 3D terrain with updated graphics and true elevation data. Elevation data is absolutely spot-on; the hills and mountains are the correct height and areas like Denver, Colorado are actually 5,000 feet or so above sea level like they should be. 12 cities are now included in high resolution: London, Paris, New York, Los Angeles, San Francisco, Chicago, Boston, Seattle, Washington DC, Berlin, Tokyo, and Rome. They should all look stunning. Apparently there will be 40 other cities included in detail. There should be a massive improvement in other areas with over 20,000 airports and a Jeppesen NavData database.

FS2K includes varying types of airports, ranging from major international terminals to small town airstrips. The Jepperson NavData database includes VOR's, NDB's, airways and intersections worldwide.



Flight Simulator 2000 Professional Edition Features

- > FS2000 standard edition aircraft plus Raytheon/Beech King Air 350 Mooney Bravo (total of 12 aircraft).
- > Six additional detailed cities: Boston, Washington, DC, Seattle, Berlin, Tokyo, and Rome.
- > Added Panels: Two high-resolution, extra-large instrument panels for the Mooney and the Cessna Skylark.
- > Flight Dynamics Editor
- > Instrument Panel Editor
- > Expanded printed manual
- > Samples of and a discount on a CD-ROM training package from Cessna
- > Discount on FlightSafety International add-on products
- > Discount on flight training videos from King Schools



The new aircraft look lovely, though the 'fat' nose on this Concorde perhaps needs more work before release.

There is also a graphical flight planner where it is possible to plot your route automatically or manually choose waypoints or airway routings of your own.

Over the past months we have seen FS2K on an assortment of PC's and 3D video cards. The frame rates, though unexceptional, were sufficient to provide smooth flight, although you will certainly want to make sure you have a good set-up to get the most from this program. Traditionally during development frame rates improve toward release time.

We tested the scenery by taking a flight in a Mooney aircraft from Merrill C. Meigs Airfield, Chicago, to Chicago O'Hare's International airport. The scenery is incredibly realistic. Meigs Airfield is much improved with many added colours in 3D graphics mode. The control tower was magnificent, with see-through windows and realistic looking textures. Looking to the right at Meigs airfield over Lake Michigan, you can see cruise ships and boats covered with photo-realistic textures sailing across the water. The skyscrapers of Chicago were also covered in better textures and flying above them gives you a real sense of reality. Even close up, at just a few feet at these same buildings, gives one the impression of graphic realism. Landing at O'Hare was incredible, the airport detail from terminal buildings, taxiways, runway lighting and gates are magnificent to say the least. We asked for realism and in the scenery design area, we certainly got it.

Importantly UK airports seem much improved with more taxiways and buildings. The new elevation modelling is immediately apparent, adding to the overall feel. It is nice to see Microsoft taking time

Importantly UK airports seem much improved with more taxiways and buildings.

to add details to small airfields such as Stapleford Abbots (just north of London, next to the M25 motorway) with its part-tarmac runway on the southern approach.

There are many more variables for seasons and time of day. Seasonal texturing over the scenery such as snow, or leafless trees during autumn, is also apparent. When accessing and changing seasons or time of day, as with most other choices within FS2K, the menus are graphical. We had fun just exploring and admiring the graphics included with the menus alone and seeing

how the textures look before going back to flying the simulation. It was the same in this respect for cloud variations too, in which there are many. Several cloud layers and winds can be chosen or you can download from the Web current weather reports provided by Jeppesen. FS2K automatically creates current conditions worldwide. Thus it would be possible to see the weather change before your very eyes during a long flight.

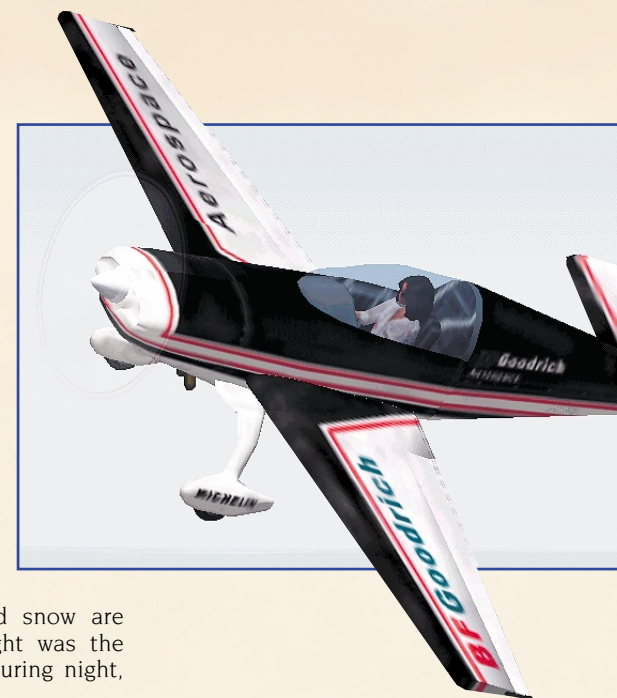
Night flying has much improved city and road lighting. Runway lighting is phenomenal, in that each runway light has a soft glow to it creating an incredible effect. The sun now makes an appearance and moves around depending on the time of day. The moon and star constellations also move around the night sky.

Clouds are terrific, nice and fluffy, both from the outside and flying through them. The shades and colours of the various clouds are very realistic. At last we can fly in a typical English overcast or rainy day! It almost feels like you can go out and grab those clouds, such are the excellent 3D effects. Gone are the square block type clouds we saw in previous versions – although up close one does notice some pixellation. The clouds effects, if set up in layers, can be transparent. Fog, hail, rain, thunderstorms, lightning and snow are also available. Another delight was the different colours in the sky during night, dawn or dusk.

ATC and Flight Lessons

At one time Microsoft announced that FS2K would include interactive ATC (Air Traffic Control). While ATC has been improved with more sound bites (wave files) and contains more adventures than previous versions it is not interactive.

During our interview with Microsoft's Bruce Williams we were given the impression that FS2K would have spoken ATIS (Automatic Terminal Information Service) messaging. This was to replace the scrolling text that was found in Flight Simulator 98. We have not seen this included when trying out the early test version and we do not know if Microsoft have managed to incorporate this into the release of FS2K. It would be a great addition as FS2K's rivals, such as Fly!, have this feature already.



in the mean time we are sure your aircraft and scenery collections will be safe.

Conclusion

There are many excellent and improved features in FS2K; it is a wonderful flight simulation program, even at this early stage. When Microsoft say it is a significant improvement, we totally agree, it is going to be a truly exciting flight simulation program come release time.

Whatever the final quality it is inevitable that FS2K will again dominate the market and other simulators that have just been released, or are for imminent release, will fall by the wayside. To Microsoft's credit it seems that they have put considerable resources into FS2K's development and it is looking like they have again produced the best all round flight simulation. While rival products may seem to have better graphics or more detailed aircraft systems, FS2K exudes a completeness that will be hard to match. This is not a game folks, it is a simulation of realistic flight in an aircraft. No doubt it can be used as an educational tool for those, like all of us, who have an insatiable yearning to fly freely in the skies.

Contrails (vapour trails) were being produced at high altitudes – a pleasant surprise

training package from Cessna and training products and materials from King (John & Martha King) schools.

FS2K users have the ability to fly and interact with other pilots over the Internet, a network, or via direct modem connection. To find fellow pilots, one needs to visit the MSN Gaming Zone at www.zone.com. It is simply too early to tell as yet whether multiplayer capability in FS2K has been made better than the previous release. There is certainly room for major improvement and this will not doubt be the subject of severe beta testing by Microsoft.

Compatible aircraft, cockpit panels, adventures and scenery...

Aircraft, cockpit panels, scenery and adventures created for Flight Simulator will be compatible with FS2K. So too will many other programs. There are some that will not work and at this early stage it is hard to tell exactly what is what until official beta testing gets underway. No doubt many add-on publishers will be gaily sticking their boxes with 'FS2K Ready' adornments. We'll try and give you a run down of what truly works and does not in our next issue – but



At long last the flight lessons, considerably revamped, have been given by famous instructor and aviation humorist Rod Machado. He will take you through the basics of VFR and IFR flight in a series of new lessons. Providing you do your homework in the extensive Pilot's Handbook and FS2K help system, you should be able to polish up your flying skills. The manual will exceed 200

FS2K is realistic to the point where you never again have to listen to your family or friends refer to it as 'just a game'. Microsoft have taken the word "Virtual" from "Virtual Reality".

Trevor Morson

Clockwise, from bottom left: Boeing 777, Mooney Bravo, Extra 300S, Sopwith Camel and the Schweizer Sailplane



More bang for your buck?

The latest in Sierra's ProPilot series has received a mixed reception at recent 'trade-only' outings. Like its predecessors, Pro Pilot 2000 aims to introduce the fundamentals of flying civilian aircraft.

Aircraft included this time around are the Cessna Skyhawk 172 R, Cessna Skyhawk 172 SP, American Champion Decathlon 8KCAB, Beechcraft Bonanza V35, Bonanza Baron B58, Beechcraft King Air B200 and the Cessna CitationJet 525. Each has been redesigned both inside and out with moveable control surfaces, external taxi and landing lights, engine sounds, multiple window viewing, and detailed instrument gauges.

The seven aircraft have been selected to follow the natural course that a real life pilot might take from basic flight training upwards to small jets.

ProPilot 2000



ALSO COMING SOON...

Software Title: Flight Simulator 2000
Publisher: Microsoft
Web site: www.microsoft.com/games/

Software Title: Flight Unlimited 3
Publisher: Looking Glass
Web site: www.lglass.com

Engine start-up sounds have been recorded from their real-life counterpart. The ProPilot 2000 engine sounds are proclaimed to be the best in the business.

Sierra claims that each cockpit panel will be fully functional. Every switch, knob, and button is said to be fully interactive. During the redesign of the panels an in-dash GPS has been included for every aircraft.

A major flaw in all these improvements is that the maximum resolution of ProPilot 2000 is only 800x600. Given its rivals' support for much higher detail, this seems a massive weakness.

ProPilot 2000 will incorporate 48 video tutorials running from CD as AVI files. The lessons will cover basic and advanced flight manoeuvres, instrumentation guidance, and pre-flight/post-flight preparation. An impressive 350 odd page manual will accompany the tutorial. The manual will utilise Federal Aviation Regulations and provide guidelines of general and professional aviation, concepts of aviation, theories of flight and procedural information. With further coverage on information on aircraft systems, airspace

classifications, radio communication and navigation it should provide plenty of useful bedtime reading.

Advanced users will find a "Pop-Up Operator's Handbook" that is even accessible in 3D graphics acceleration mode. It will provide information such as checklists, performance data of each aircraft and so forth.

There are 14,800 square miles of photo realistic terrain included this time round, with 37 major metropolitan areas covered. There are expected to be over 4,300 airports in the United States, Western Europe, Canada, and the Hawaiian Islands. Sierra have now added taxiways to class D airports in the United States. Nearly all the airports are expected to include windsocks, runway lighting, plus wide support for frequencies such as Multicom, Unicom, FSS, ASOS, AWOS, ATIS, Approach, Centre, and Departure. It seems that VFR & IFR terminal procedures will be supported too.

Engine start-up sounds have been recorded from their real-life counterpart.

Full use of what one might class as "Necessary Navigational Aids" will be covered: ILS (Instrument Landing System), NDBs (Non Directional Beacons), and VOR (Very high frequency Omni-directional Range). Another nice surprise was to see that Sierra have been working on "Victor and Jet Routes" - (Controlled corridors or roadways in the sky that connect nav aids). Together with the planned enhanced ATC (Air Traffic Control) audio these aspects sound promising.

Flight Planning is included now. It seems that flight simulation publishers have at last been listening to their customers, as this feature seems to be in every new product! In this instance the flight planner allows an individual to select a departure airport, arrival airport, aircraft, and the waypoints in between destinations. To make it easier for novices a "Flight Planning Wizard" will automatically generate a route

by selecting waypoints between the pre-selected departure and arrival airports. If you do not like the waypoint selections then you will be able to manually change those to whatever you want to use. Once the route has been finalised, the flight planner will provide extra weather information, fuel consumption, travel time, wind velocity, wind strength and waypoint frequencies. All good additions not covered in ProPilot 2000's competitors. Users will also be able to customise weather, select dynamic weather or adverse weather conditions, plus SIDs (Standard Instrument Departures), STARs (Standard Terminal Arrival Route), approaches and alternates. The "Alternate" airport addition is a nice feature that PC Pilot is looking forward to checking out on the final version.

ProPilot 2000 will provide automatic, dynamic, and adverse weather conditions for real-world challenges. Weather effects include precipitation, hail, snow, lightning, thunder, and turbulence. If using 3D graphics acceleration card you can also add options such as sun glare, Bilinear Filtering (image smoothing), and volumetric cloud effects. Pro Pilot 2000 will support 3D graphics cards that support 3DFX and OpenGL 1.1 and 1.2.



Generally ProPilot 2000 looks like a worthwhile improvement, though whether it can stand up against the more complete sounding Flight Simulator 2000 is another matter. Curiously, Sierra is marketing ProPilot 2000 as "the only simulation that includes a general aviation and professional simulation in one box" - a dig perhaps at the two versions of Flight Simulator 2000, even though Microsoft's product looks like it will be far more comprehensive - with higher screen resolutions, 5 more aircraft and 15,000 more airports ... Sierra will have their work cut out to put their product top of our shopping list.

Mike Clark

PREVIEW

Developer: Sierra/Dynamix
Website: www.sierra.com/dynamix/pilot/
Price: US\$39.99
Release Date: TBA

There will be a US\$20.00 rebate for previous owners of ProPilot. Currently the product has no firm date for release in Europe.

System Requirements:

Minimum - Pentium 200, 32 MB RAM, 4x CD-ROM Drive, 800x600 screen resolution, 150 MB Hard Disk Free Space
Recommended - Pentium 266 MMX, 48 MB RAM, 12x CD-ROM Drive, 3Dfx Video Accelerator, 800x600, 600 MB Hard Disk Free Space

Flight Unlimited III

PREVIEW	
Manufacturer: Looking Glass Studios	Price: TBA
Tel: +39 31 241444	Release Date: October
Pros: Very pretty. Great to experiment, tinker and learn the tricks. We love the flying boat. Nice sounds. Good to see the inclusion of a flight planner that can be patched into a GPS system. We definitely like the dynamic 3D Object Editor and the general "busy" feel.	
Cons: Detail could be a system killer for frame rates. You WILL need a super huge system to run it. Limited scenery area. Satellite scenery is a bit of a mush at lower levels.	
System Requirements:	
Minimum - Pentium 233 Mhz, 32MB RAM, 300 MB free HD space	
Recommended - Pentium II 350mhz, 64MB RAM, 2.1 GB Hard disk space and 3D graphics card	



Third time lucky for Looking Glass?

Each aircraft has a gorgeous interior

Caught bang in the middle of shattered dreams of Fly! and the hype now surrounding Flight Simulator 2000, this is one simulator that could easily be overlooked.

Flight Unlimited III (FUIII) is produced by Looking Glass, who are by no means a virgin company. They have been acclaimed in years past for notable releases such as Chuck Yeager's "Advanced Flight Trainer" (for those old enough to remember!) and of course the previous incarnation of Flight Unlimited.

Tom Sperry, Project Director and Producer Sandra Smith lead the team of developers this time around and they have attempted to create a fresher, more dynamic version of Flight Unlimited.



Cockpit panels are detailed and much improved



The Red Baron's Fokker DR.1

Contrary to its name, a quick overview seems to indicate that FUIII may not be quite as 'unlimited' as its name suggests - the scenery area is limited to the 10,000-odd square miles from Seattle to San Francisco. And the aircraft types are limited to small jets and props only.

However, closer inspection reveals so much detail and features you would have a job to experience it all before the next release.



The Stemme S10 VT glider

Flight Unlimited III has been given major overhauls to its predecessor's aircraft interiors and exteriors. The Piper Arrow, Trainer 172, Muskrat Seaplane, Windhawk and P-51D Mustang have all had major sound, textural and dynamics facelifts and seem to look better than ever before. The interiors of some of these aircraft are at least equal if not much better than current rival offerings.

New aircraft that have been added are the Beechjet 400A, Mooney TLS Bravo, Lake Turbo Renegade 270 Seaplane, Stemme S10 VT Turbo Chrysalis and the Fokker DR1. The developers claim that these are based on original designs from various manufacturers. All have been equipped with autopilot and have been reproduced



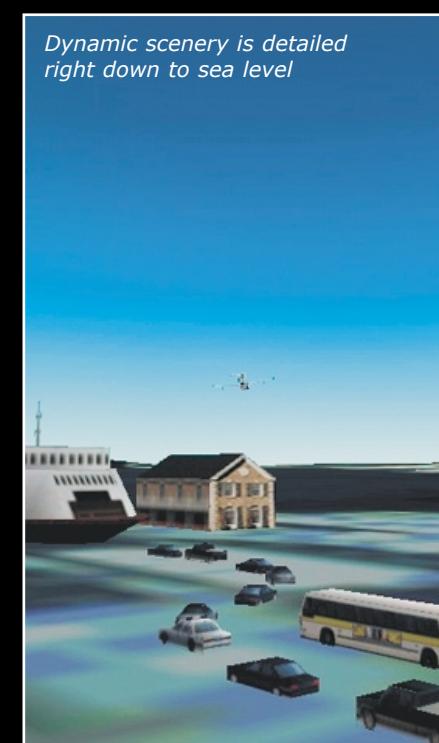
The scenery is awesome.

in the style of the real thing. One nice touch is the addition of an active, precipitation finding weather radar found in the Beechjet showing up regions of heavy rain or snow. All aircraft are equipped with various landing and taxi light controls, de-icers, engine systems and flight controls.

ATC? You bet . . .

Some aircraft have animation effects added. The appearance of all aircraft is reasonably smooth, as you would expect. However, like most things your system set-up will dictate the quality. We noticed that the aircraft exteriors look jagged in places but deduced that this was a compromise in favour of frame rates by the developers. FUIII can handle a resolution of up to 1024x768; this helps when rendering aircraft and satellite scenery but can cause major degradation in performance. We await testing of the final version to see how the finished product flies!

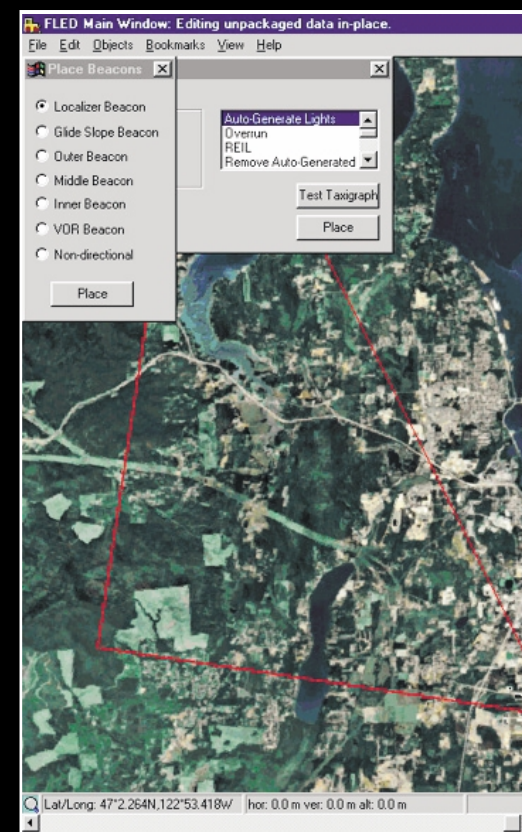
Dynamic scenery is detailed right down to sea level



ALSO COMING SOON...

Software Title: Flight Simulator 2000
Publisher: Microsoft
Web site: www.microsoft.com/games/

Software Title: ProPilot 2000
Publisher: Sierra/Dynamix
Web site: www.sierra.com/dynamix/pilot



The Flight Editor seems easy to use.

FLIGHT Unlimited III

A GPS (Global Positioning System) is included, with the ability to import data from the included flight planner. This has always been one of the major drawbacks and disappointments of other simulators in the past. It looks as though that in FUIII things have changed for the better.

ATC? You bet. Although Flight Unlimited 2 was praised for being one of the only civilian simulators to have this feature included, it was also heavily criticised for being unrealistic. We are told that the ATC in FUIII has been enhanced and tweaked to make interaction a lot better than before.

Flight Unlimited III looks to be 100% better than it's predecessor.

Do all clouds look as good as our screen shots show? We shall see. What we can say is that the weather has been vastly improved upon and will be a match for Flight Simulator 2000 or even Fly!. But we will need to wait to see what kind of system will be able to take advantage of all the effects on offer in the finished article. Wind, mountain lift, soaring, icing, slick runways, snow, rain, spot showers and storms and all the cloud families associated with frontal weather are promised in this release. A nice inclusion is the addition of haze and phase of the moon effects.

FUIII concentrates mainly on the Seattle region - made up of satellite imagery. Not everyone is a fan of satellite scenery, for good reason. The 4 meter per pixel textures look totally fantastic from a few thousand feet, but as soon as you get down to one thousand feet or ground level, the whole effect is lost in a blur of pixels - what we call 'mush'. It would be nice to see a compromise here somehow with switching 32bit textures but for now we are resigned to wait, perhaps for when hard disk space and processor power are optimised even further. If you were wondering if your existing San Francisco scenery will work from FUII, Looking Glass assures us that it will, seamlessly. Just make sure you haven't lost your original CD from Flight Unlimited



Storm clouds ahead



Beechjet 400A cruises towards Seattle



The popular Mooney TLS Bravo



Piper Arrow flies straight and true



The unusual Lake Turbo Renegade 270

III! In addition to the high resolution Seattle terrain, simmers can check out all of the Western United States (Washington, Oregon, California, Idaho, Utah, Nevada, and Arizona) with a more generic texture base. Pilots will have the ability to take a flight over Salt Lake, the Grand Canyon or Lake Tahoe. All nav-aids are provided for cross country and IFR flights and the terrain is based on government data.

One of the newer and more exciting features in this release is the introduction of the Flight Editor. This will basically be an object editor where you can add or remove 3D objects wherever and whenever you wish. This is fine if you know Seattle and San Francisco really well of course, but we reckon it's good if you just like to tinker with details to keep you occupied. Ever wanted a cow running across the runway? Now you've got it!

... so much detail and features you would have a job to experience it all ..

Dynamic "AI" objects and aircraft are also planned. As in other simulations they will be interactive and respond to the users actions. It's a shame that more developers do not pay closer attention to this kind of detail, it does truly affect the "realism factor". Objects such as boats, trucks and even animals will be included, plus we are also promised "a few surprises in store".

Knowing that not everyone is an expert, some will be relieved to know that novices are catered for with a range of tutorials within the product to help assist your simulated pilot training.

On the whole, Flight Unlimited III looks to be 100% better than it's predecessor. There still remains the tricky issue of the far from unlimited scenery and potential frame-rate pitfalls, but if you like San Francisco or Seattle then this is definitely going to be on your shopping list. FUIII due for release in Europe around the time you read this and we'll be bringing you a full review in the next issue. ■

Mike Clark



The weather in FUIII looks great.

PREVIEW

Price:	TBA	System Requirements:
Release Date:	Early 2000	Minimum - Pentium 200, 32 MB RAM, 4x CD-ROM Drive, 800x600 screen resolution
Developer:	Wayward Design	Recommended - 3D graphics accelerator card
Publisher:	Microprose/Hasbro	
Website:	www.hasbrointeractive.com	

B-17 Flying Fortress II — The Mighty 8th

Those of you interested in strategic flight simulations may remember a title called B-17, based unsurprisingly on the World War II bomber of the same notation. It must be some time ago since it was released (none of us at PC Pilot can quite place it in our minds). Microprose, now owned by Action Man maker's Hasbro, built a reputation for good, solid simulations on titles such as that.

Microprose have now resurrected the bones of the original simulation for an all-new outing, this time developed by Bristol-based Wayward Simulations. The essence of the original is there: command the B-17G with its 10 crew members, navigate accurately across Europe to locate and bomb strategic targets and defend the plane and its personnel.

The immediately apparent feature is the simply stunning graphics engine. Although



A downed 109 with the ground detail shown below.



Strafing a tanker shows each round hitting the water to wonderful effect.

we have not had time for extensive flights, seeing the graphics in action is mind blowing. Forget rough, digitized satellite imagery. The ground scenery in B-17 II adapts, as one flies closer to the ground, giving an amazing impression of depth and realism. Wayward claim that every road and village in Europe is as it should be. Certainly it is fun diving towards a village and seeing the lanes and hedgerows appear before you!

Exclusive Preview Shots!

The simulation can be strategic or as simple as you wish, with either immediate action or campaigns where you must take on roles as pilot, bomber, navigator, engineer or gunner. And manage the well-being of the other crew! In service, the B-17G was renowned for its structural strength even after suffering massive damage and the developers promise the feel of the aircraft is exactly modeled on the PC.

The final simulation will include pilotable versions of not only the B-17G but also 8th Airforce escort fighters such as P38, P47 and P51. You can of course take the Italian approach, switch sides and fly the Luftwaffe defenders in a Fw190, Bf109, Me262 or ME163.

B-17 with one engine down, she should make it home.

P51 shows off its lovely detailing and the neat touch of vapour trails.

Over 25 missions are promised and the ability to fly multiplayer over a LAN (local area network) or up to 200 Internet players.

We have been promised some exclusive flying time by Wayward and hope to bring you fuller details in the next issue. Even if you are not keen on combat flight simulators, this title is looking good enough for any simmer to put on their wish list.

Mungo Amyatt-Leir



Each aircraft has nicely detailed working cockpits.



Crew in the front are vulnerable to attack.



There are wonderful views inside the B-17.

Wilco's anticipated sequel takes flight...

Airport 2000

Volume 2



Nice airport as Virgin Express waits on the tarmac. It is also a nice airport.

Wilco's release of Airport 2000 for Flight Simulator 98 caused something of a stir. Gorgeous graphics and sophisticated adventures tempted many, though the title was also criticized for slow frame rates and frustrating ATC (Air Traffic Control). It was easy to find oneself flying in circles or waiting, frustrated, on the apron for take-off clearance.

A year later and the highly anticipated sequel has just been announced, with more detailed airports, new aircraft and adventures. It's too early to say whether Volume 2 will be blessed with friendlier frame rates and better-behaved ATC, but the screen shots, as ever, look stunning.

As expected, more the same is on offer: 7 new airports, 9 new airplanes and 10 new adventures.

The airports included this time are London Heathrow, Barcelona, Nice Côte d'Azur, Amsterdam Schiphol, Boston Logan, Miami International and Chicago O' Hare. As the screen shots show, London Heathrow looks stunning and certainly will make any UK flight simmer drool with anticipation.

Wilco promise improvements with better ground markings and even busier traffic with aircraft supplemented with cars, buses and other ground vehicles.

We have yet to fly any of the new aircraft, but the external visuals seem to have kept

United Airlines A300 taxis at Chicago O'Hare

pace with technology with a more rounded appearance, moving control surfaces and landing lights immediately apparent.

As mentioned, one disappointment with the original Airport 2000 was the over-sensitive ATC adventures. The new adventures are claimed to have been improved and easier to fly with more depth and emergency situations such as engine fires and tyre blowouts. A nice touch for owners of the original is the inclusion of 3 adventures linking to the airports in Volume 1.

All communication from tower to ground and departure control is there, adding auditory delights to the package's visual treats. You get instructions from multiple

Virgin Express 737 parked away from the gates at Heathrow – just as in real life, unfortunately.



British Airways 767 at Miami – notice the new rounded engine cowlings.



An RJ 85 belonging to AirUK approaches the gate at Heathrow.

air traffic control centres, vocal captain calls and read-backs and an accurate Ground Proximity Warning System with sounds recorded from actual aircraft and simulators. There's even a co-pilot who assists you throughout the flight by telling you when you've neglected a procedure or when something has gone awry.

The package should also come with good documentation, with airport charts and diagrams to assist those early winter morning departures!

Wilco promise improvements with better ground markings and even busier traffic...

Airport 2000 Volume 2 is slated for a November release (no doubt Wilco are hoping to get on Santa's list from many simmers), around the same time as Flight Simulator 2000 is on sale. With Microsoft's title boasting improvements at some of the same airports, it will be interesting to see whether Airport 2000's next installment will be worth splashing out on. We hope to have a review in the next issue.

Mungo Amyatt-Leir

NEW EDITION. NEW AIRCRAFT.

The following aircraft are promised for inclusion:

Boeing 767 British Airways
Boeing 767 DHL
Boeing 737-300/400/500 KLM
Boeing 737-300/400/500 Virgin Express
Boeing 737-300/400/500 US Air
Airbus A320 NorthWest
MD-83 Wilco
RJ 85 Air UK
King Air 350 Business

PREVIEW

Developer:	Wilco	Price:	£29.99
Distributor:	The Associates	Release Date:	Nov 99
Website:	www.flightsim.co.uk		

System Requirements:
Minimum - Pentium 166, 32 MB RAM, 4x CD-ROM Drive, 800x600 screen resolution
Recommended - 3D graphics accelerator card, plus lots of RAM and hard disk space!

Together in Electra Dreams

Passion, Friendship & The Virtual Aviation World . . .

This picture shows how the FS98 aircraft compares to the real Reeve Electra. The Virtual and Real Reeve Electra N9744C at the Gate in Anchorage.

It might have been the drone of the propellers, or the whine of the engines, but something about the Lockheed Electra got my attention early in life.

At three months old my mother took me on my first aeroplane trip to see my grandparents. My Dad was a pilot for Eastern Airlines, so we flew standby, catching an Electra from Washington D.C. to Boston. The photograph she showed me confirmed that that maybe I was not as crazy as I thought in my passion for the Electra!

I love most aircraft, but the Electra has always been special. The last six years of my adult life I have worked like mad to bring the

Electra to life in the world of flight simulation. I have gone to places I would never have imagined to document the Electra. I have spent hundreds of hours in front of the computer building an "electronic model" of the four-engine bird, just like I did as a kid building plastic models.

It all started in 1977, while I was in high school in Northern Virginia, I saw a full-page advertisement in The Washington Post, announcing that the final Electra "Air-Shuttle" flight had been flown and that quieter jets had replaced the plane. To me, quiet wasn't the point. There it was, a full-page photograph of the giant inboard prop

and engine, framing the air stairs, and I knew that it was final.

The loss was great and I turned to the computer for my flying fix. From the moment that a Personal Computer could run a flight simulator, I had one. With each new simulation release, I would scratch together the money to buy the hardware needed to run it. I became a fan of the Microsoft family of simulators, and was duly excited in the early 1990's when Microsoft came out with Flight Simulator 4.



Don McClure Taxies An Eastern Electra at DCA



The Cabin of the Reeve Electra. Did that used to be an Eastern Electra?

Then something wonderful happened. Laemming Wheeler released a program called "Flight Shop" that allowed ordinary people to design custom aircraft that would fly in Microsoft Flight Simulator. All of a sudden a whole new world opened up. For example, there was a great on-line flight simulation forum community building on CompuServe, where one could download hundreds of original aircraft designs.

This is when I began to hatch a crazy idea. If the real Eastern were gone, then I would help recreate the airline in the newly emerging "virtual" world. I started by buying Flight Shop and designing the best Electra I could. I learned how to use the 3D CAD (Computer Aided Design) program, and my first work was a redesign of another person's Martin 404. I learned how to make individual parts, components and structures, and learned how to repaint aircraft. I was pleased that the new "virtual Eastern" had its first aeroplane back in the skies.

I talked with, and learned from other aeroplane designers, and met one of the finest designers, Brian Oualye. Brian was also from an Eastern family, and we set out to rebuild the fleet. I would work on the early aircraft, such as the Martin, the Electra and the DC-7B, and Brian would work on jets.

It was not until late 1995 I finally had an Electra design that I approved of, and I put it on the CompuServe forum, paired with some good sampled sounds by Mr. Serge Baye. Before long I had designed liveries for many of the airlines that had flown the Electra, and for the new "virtual airlines" that had begun to grow on the Internet. Little did I know that this was just beginning.

As my revisions on the Electra continued, I began work on a virtual DC-7B. At about that time, a fellow named Kenneth Kerr had begun to offer original designs of authentic instrument panels, of the DC-3 Dakota, for Microsoft Flight Simulator.

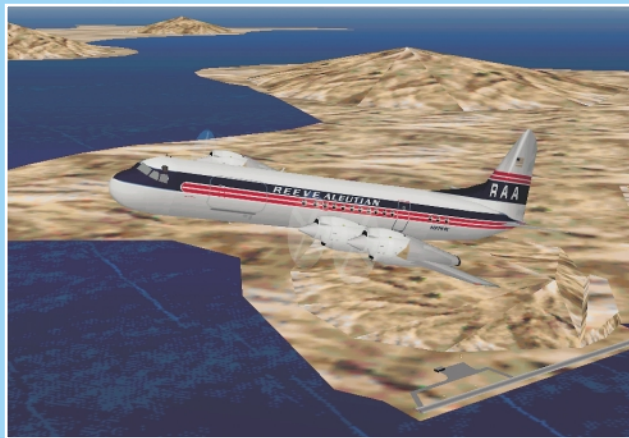
I tried to convince Kenneth that there would be a market for the Electra panel and plane, because, like the DC-3, the Electra was a pioneering aircraft at the time, and still has a loyal following today. He agreed and together we produced the VIP "Electra Package".

We sold the package directly over internet, and Kenneth and I became very close friends in the process. I also began to meet some of the great people that loved the real Electra, encouraged me to continue improving the Microsoft Flight Simulator version. A chap called Bill Dailey, in particular, wanted me to repaint the plane in the colours of Reeve Aleutian Airways, A company who I had never heard of.

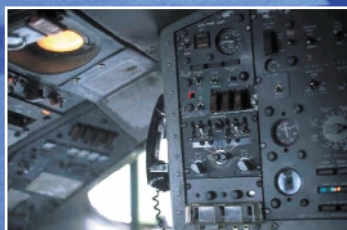
He let me borrow an airliners book, and told me that the Reeve Electras were actually still flying passengers in Alaska, and that I should have their planes as part of the VIP package.



See how the actual and virtual panels compare



This screen shot shows the Electra on departure from Sand Point, Alaska.



A Portion of the Engineer's Panel on the Electra

Note the Prop pitched for Cruise over the Rugged Alaskan Terrain



He told me about a great feature article in "Airliners" magazine on the Reeve Electras, and I ordered the back issue. The glorious photos of real Electras, still flying passengers, were intoxicating. I just had to go to Alaska and fly on the Electra!

Maybe Reeve Aleutian Airways would be interested in a Flight Simulator 98-based package? I spoke with an enthusiastic Kriss Bredehoft, and asked if I could come to Anchorage and make a documentary. Within a month I was cleared to go.

I flew to Alaska in June 1998. I stepped into a world of bliss, having received clearance to fly to every destination that Reeve flew to in the Electra. Kriss kept me very busy - on the first day the first day I was scheduled to fly from Anchorage to Cold Bay, then to King Salmon and back to Anchorage.

The Electra up close is a truly beautiful aircraft. The propellers seem just as awesome as when I was a boy, and in combination with the sweep of the Allison engines across the rather taut wing, were an impressive sight. The nose of the Electra is very round, which makes for a fine contrast against the squared

BILL SCHULZ

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The CD-ROM multimedia documentary produced from Bill's trip to Alaska is entitled, "Electra! Flying Alaska & the Aleutian Islands in the Lockheed L-188". It is available worldwide through The Associates in Europe, www.flightsim.co.uk or telephone +44 (0)1480 462748 or Flight One in the United States, www.flight1.com, telephone 1-877-PCPILOT.

For information on the SAVE-AN-ELECTRA FOUNDATION (modelled after the "Save-A-Connie Foundation"), contact Bill by e-mail as above.

wing and props. The tail arches and curves into the sky, and blends into a concert of shape with the dihedral horizontal stabilisers.

Inside, the Electra is spacious and has a very open feeling in comparison to today's cramped jets. The large windows let in lots of light, and the overhead racks resemble those found in old buses. Reeve has the capability of arranging their Electras to seat anywhere from 23 to 80 people, with cargo in front taking up the leftover space. The cockpit has plenty of room for the flight crew of Captain, Second Officer and Engineer. The jump seat is directly behind the Captain's, and is functional, but not comfortable.

I boarded the Electra bound for Cold Bay, and strapped myself in the jump seat, and began to roll the video for the start up procedures. The crew worked in unison to bring the four Allison 501-D-13 turboprops to life. Each Allison starts with a low whirr that increases in pitch and volume as the engine gains RPM. Then, as the pitch becomes fevered, the engine has reached its full RPM. At this point the prop sounds can be heard clearly.



My Dad, W.C. Schulz Jr. in the Electra, on his first flight as a Captain with Eastern.



Reeve Aleutian Airways Electra N1968R at Dillingham, Alaska



The Flight Deck of a Reeve Electra

A Comparison of the Final Approach to Dutch Runway 30 in the Flight Simulator Add-On and real life.

The Electra is a pilot's plane. She is powerful, agile, responsive, forgiving, and sturdy. She can land and stop on very short runways, even landing on ice and snow packed runways with little wheel braking. The Electra can handle incredible crosswinds on landing (Reeve Electra pilots do not have a maximum crosswind limitation), and she is capable of flying with ease in icing conditions that would tax other planes. Since her thrust and primary lift comes from the pitch of her wing-like propellers, she can respond instantly to throttle controls, all of which gives her a degree of safety in the Alaskan skies that is unmatched by any Boeing, Douglas, or Airbus aircraft. This point was driven home to me during a trip to Dutch Harbor, Alaska.

The plane was full. All the other airline flights to Dutch had been cancelled due to strong winds and "blackwater" - rotor winds that can reach 80 miles per hour. We left Anchorage near noon, and a couple of hours later began our descent through a thick deck of stratus clouds towards Dutch Harbor. I did not know what to expect and when we cleared the clouds at an altitude of about 1,500 ft, we were entering the bay into the Harbor, with Tabletop Mountain above and to our right and Needle Rock on our left. Ahead was Unalaska and Hog Island.

The view was spectacular, and the ride was very rough. Dark clouds shrouded some of the volcanoes to the left and right, while a spot of clear sky teased ahead. There were high white-top waves being blown below and one could see the "blackwater" rotors clearly and, thankfully, far away. The Captain put on his high contrast yellow glasses and began the final approach, flying directly for Hog Island and the base leg to runway 12. I kept searching for the runway, wondering where it was. Of course, Mt. Ballyhoo, on the left of us, kept it hidden until we were almost on final.

The Captain did not like the prevailing conditions, and called for a missed approach and go-around, to try and see what the approach to runway 30 looked like. We proceeded to reverse our course, and flew a "360" around Mt. Ballyhoo, and towards the gap between Ballyhoo and Mt. Newhall. The Captain again called for "flaps 78" (percent), and then "gear".

Meanwhile, the Electra was crabbing about 20 degrees off the runway heading on final, when we were hit with wind shears. The Captain throttled up to compensate for the shear's effects and the Electra did not lose a beat. On short final the Captain added another short burst of power and hit the rudder to take the crab out and make a perfect landing. It was a brilliant piece of flying in an aeroplane built for such challenging conditions.

After my four days documenting the Reeve Aleutian Electra operations, I flew home and went to work building the virtual Electra and the Aleutian Island scenery for Microsoft Flight Simulator.

I began with a reworking of the plane itself, using the photos and video as a visual reference. I also customised the Flight

Simulator sounds by taking samples from the digitised video that I had shot and mixing them into a sound suite for use in Flight Simulator 98. Mike Vidal provided improved flight dynamics for the Electra so that the plane now flew very close to the real thing.

*I flew to Alaska in June 1998.
I stepped into a world of bliss...*

I then sent photos to Kenneth Kerr who, with some additional work by Tom Main (incidentally co-developer of the 747-400 reviewed in this issue), did a masterful job in recreating the Reeve instrument panel layout for the Electra.

I also began work on designing the Aleutian Island scenery, using the Abacus Scenery Designer. I used NOAA sectional charts and approach plates, as well as photos and video as reference to get the Flight Simulator scenery as accurate as the technology would allow.

Finally, I assembled a series of situations that placed the Electra at the various Reeve Aleutian Airways stations I visited as a part of my trip. The end product is, in my opinion, a wonderful and unique way to relive the experience of an Electra.

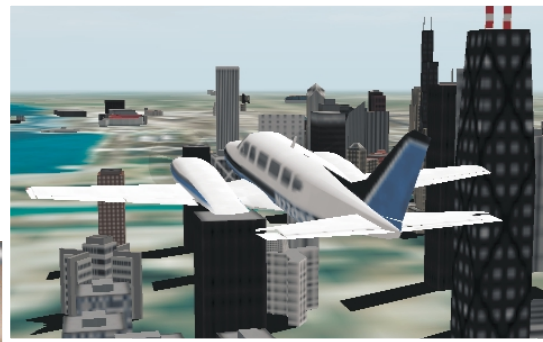
According to Reeve Aleutian Airways, it is likely that the Electra will be retired from service sometime before the winter of 1999 and only those that fly cargo will remain.

I treasure the opportunity to have created, in the world of virtual flight, the Electra as a passenger airliner. I now fly in the virtual skies of Alaska often. Flying in the virtual Aleutians, in real weather conditions, is very challenging and it is nice to know that an error is not fatal! A good approach and landing into Dutch, or Sand Point, is very rewarding indeed. When I want to be with a few more pilots, I fly my Eastern Electra in the virtual airline "Air-Shuttle", and am now pilot-in-command. I still feel like a kid, and have no plans to stop my love affair with the Electra!

Bill Schulz



The Author with 44C at Dutch Harbor in the spring of 1999



Navajo over Chicago



Malibu flying under the Golden Gate



Beautiful clouds!

Fly!

The future is bright, but is the future Fly!

In the decade or so that PC flight simulators have been gaining popularity, few would dispute that the leader in civilian simulators is Microsoft Flight Simulator. Recently, however, more companies have been challenging that lead. Among the most promising contenders is Fly! from Terminal Reality. Although no simulator is perfect, this one attempts to come closer than most. Its stunning graphics, superb flight modelling, excellent navigational aids and wide selection of user options make it one of the top civilian offerings. Fly! is not for the faint-hearted PC - taking advantage of its power requires a powerful platform. The recommended minimum is a Pentium 200 MMX machine, but good performance demands an even faster one. Optimal RAM is advertised as 64 MB, but the developers admit that 128 MB makes an important difference. Even more

demanding is the necessary hard drive space. The full install requires a staggering 1.6 Gigabytes! On balance, however, that's not unrealistic given today's large drives. If you're serious about your simulation, you'll no doubt find the space.

The full install requires a staggering 1.6 Gigabytes!

The 288-page user manual is well written and convinced me to go for the full installation. Fly! resides on three CDs, thesecond of which contains the high resolution scenery and the third is full of highly-detailed sectional charts. These charts are helpful in navigating, and come highly recommended. In this instance, full installation took approximately 18 minutes.



Come Fly! with me



King Air at Meigs Field

The rig used in this review included a 12 MB Diamond Monster II 3D accelerator card pushed by a 4 MB Matrox Millennium II video card. After some minor difficulty setting up the correct drivers, the Monster II provides no more than 800x600 resolution. Making the best use of the instrument panels requires the highest possible resolution. Accordingly, substituting the single-card STB 16 MB Velocity 4400 obtains excellent results at 1024x768 resolution. Since not everyone has a pile of video cards sitting around, itmight be a good idea to check you have a suitable card if considering purchasing Fly!

After negotiating the installation process, the next step is to go in and Fly! The user interface provides a number of ways to enter the simulation. One quick and easy way is through the Fly! NOW screen. It offers a number of pre-set "scenarios", that are similar to what Microsoft's Flight Simulator 98 calls "situations". Upon selecting one, you are immediately transported to a specified spot in a particular aircraft, under certain conditions. An example would be "Chicago skyscrapers" in the Piper Navajo. Users may also set up and save their own scenarios.

Users may choose from five different aircraft: a Cessna 172R, a Piper Malibu Mirage, a Piper Navajo Chieftain, a Beechcraft King Air B200 and a Hawker 800XP jet. The Hawker and Navajo Chieftain both possess excellent flight modelling - a very important criterion for judging a flight.

The instrumentation in Fly! is well done. The panels are all first rate, but it is not all good news.

Does the plane respond as if it's reacting to the inertial forces of real-world physics, or does it respond like an arcade game? All Fly! aircraft have a very realistic "feel" that is unsurpassed by any existing simulation. The flight model is not generic; each aircraft has it's own unique handling characteristics. Users may even specify different weight distributions, representing varying passenger and baggage weights. In every case, the aircraft responds differently depending on the load-out.

Another important aspect for evaluating a flight simulation is the quality of the

instrumentation. The instrumentation in Fly! is well done. The panels are all first rate, but it is not all good news.

The panels are all beautifully rendered and contain virtually every switch, lever and gauge found in the real thing. The bad news is that they are too large to fit in the view window, requiring the user to scroll around in order to view the different parts. This is why we highly recommend using 1024x768 resolution. The panels remain the same large size regardless of screen resolution and more scrollings required at 640x480. An inexperienced pilot can easily crash while searching for a gauge. Disabling mouse scrolling is advised because, with all the switches, it's too easy to accidentally scroll when you don't mean to.



King Air over water



Roomy interiors

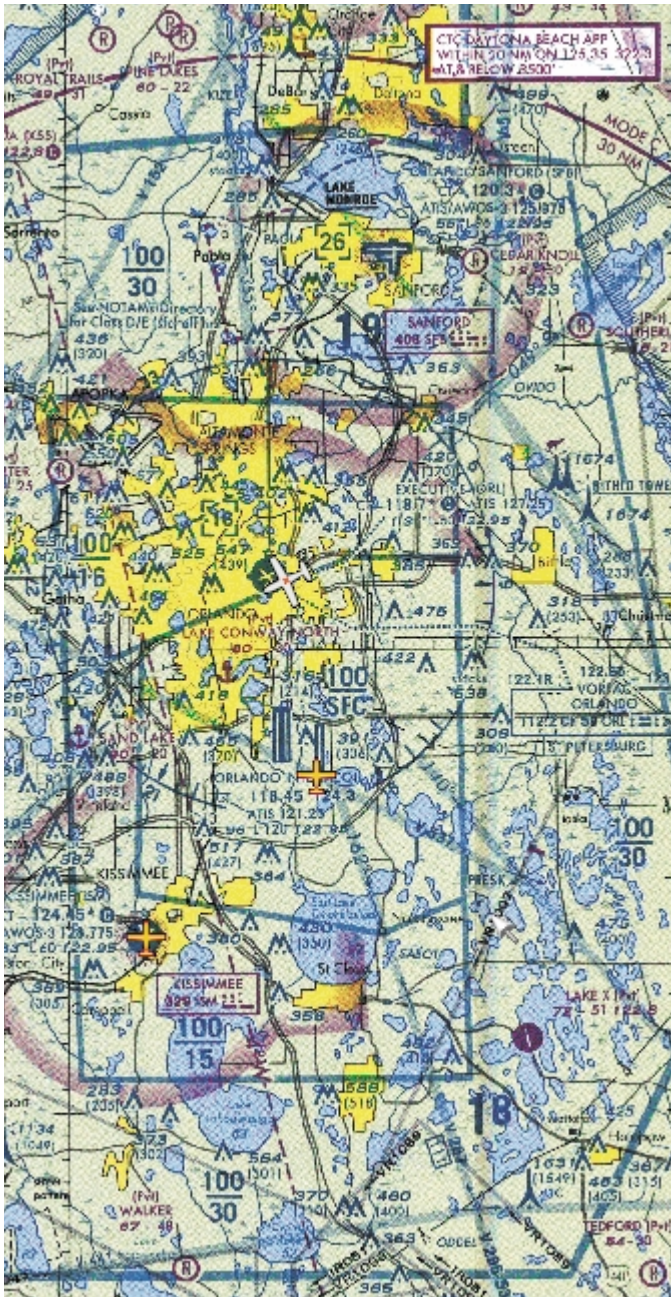


King Air view of the moon



Malibu on final to Avalon

One noteworthy aspect of the instrumentation is the wealth of navigational aids. All five aircraft panels contain VOR1, VOR2 (VHF Omni-directional Range navigation radios) and an ADF (Automatic Direction Finder). In addition, the Cessna, Malibu and Navajo are each outfitted with a GPS (Global Positioning System) receiver. Its operation is well documented in the user manual, and a large pop-up version of it is available for easier viewing. The Malibu and Navajo also have Weather Radar, which can be used for navigation. Finally, for the intrepid user, the Hawker has a complete FMS (Flight Management System) computer, with panels for both pilot and co-pilot. For some reason, the King Air only seems to have the Weather Radar and does not come with GPS or FMS. If all this equipment intimidates the beginner, that's no problem. The "M" key brings up the local sectional chart (if you've already installed them) for a nice navigational cheat. For areas outside the U.S., Shift-M displays a "vector map" on a plain background.



Lots of sectional charts



Big panels!



Hawker flying high

Multiplayer support has become increasingly important . . .

An increasingly important feature of any new flight simulation is its rendering of scenery. Once again, in this arena Fly! presents us with both good news and bad. The good news is that, within the featured scenery areas (Chicago, Dallas/Ft. Worth, Los Angeles, New York and San Francisco), the scenery is very good. The bad news is that, outside these areas, the scenery leaves a lot to be desired. From high altitude, the generic scenery tiles look pretty good. Close to the ground, however, there is a conspicuous lack of detail. Worse still, sitting on the runway at Orlando Executive, a forest of strange towers is visible. What is this thing? A radio tower? An oil derrick? It makes Orlando look like Oklahoma. Fortunately, deleting a file called obstruct.epd from the program's system subfolder removed them all.



Malibu stadium view

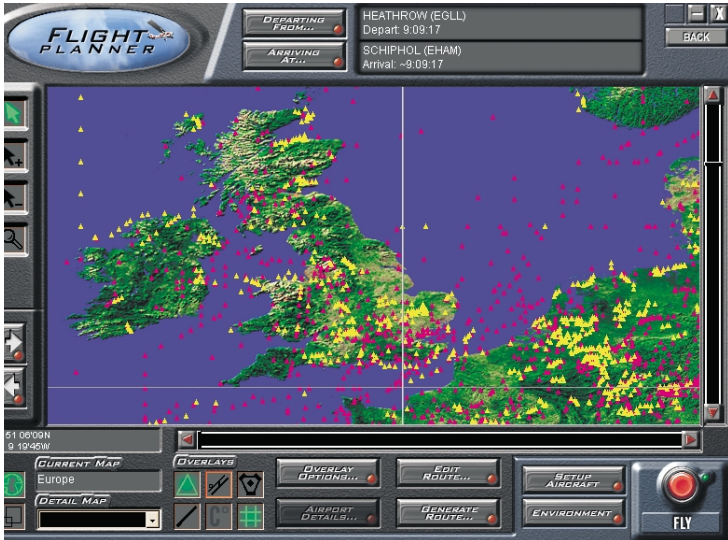


Shift your weight around

Whenever it and a promised aircraft designer are available, the future for Fly! looks bright.

Terminal Reality has promised to release a scenery designer so that enthusiasts can create their own complex local scenery. For now, the scenery does render accurate runways and taxiways all over the world. That can be more important than fancy frame-rate hogging scenery.

Speaking of frame rates, pressing the tab key reveals some handy information about the simulator's environment. Most of the time a 400 Mhz Pentium II yields a very respectable 16-20 frames per second at 1024x768 resolution.



Detailed Flight Planner

One aspect of scenery that has been often overlooked in other simulators has been the rendering of the sky. The clouds are certainly impressive - don't miss an opportunity to fly among the cloud tops. If you have a half-decent monitor, there will be moments when you will feel as if you're looking at real



Cessna over New York

clouds. Fly!'s deficiencies could be overlooked given the joy of this feature alone.

Multiplayer support has become increasingly important and again Fly! Provides a mixed bag. Disappointingly though, you cannot call a friend and fly together on the phone. Nor can you use a two-computer Local Area Network (LAN) for tandem flying. At least Fly! provides a screen that takes the user to an Internet "Flight Party". Similar to other multi-player web sites, Flight Party allows one to link with other enthusiasts online and to chat while flying. The connection is very stable and makes for an enjoyable experience.

There are other features worth mentioning. The sounds in Fly! are very well done. Rather than employing generic engine sounds, each aircraft has its own distinct sound and some of the more important sounds come from the voice of Air Traffic Controller. This comes across rather well. Another nice touch is the Artificial Intelligence (AI) aircraft that populate the surrounding sky. These are some of the many small details that come together to make this an impressive package.

Fly! is not for the faint-hearted PC . . .

Fly! is an excellent, but flawed flight simulator. Depending upon individual tastes, there will be those who immediately proclaim it to be the best General Aviation simulator on the PC market. Likewise there will be those who feel it to be fatally flawed. If Terminal Reality soon releases its promised aircraft and scenery designers, the simulator will capture more hearts as time goes by. As of writing, they have already released a number of patches to correct a number of bugs. This suggests a commitment to support the product in the future and also that you may be better to wait until its problems are fixed before purchasing.

Chuck Dome

ALSO CONSIDER

Software Title: Flight Simulator 98
Publisher: Microsoft
Web site: www.microsoft.com/games/fsim
Price: £39.99
PC Pilots rating: 4 out of 5

Software Title: Flight Unlimited II
Publisher: Looking Glass
Web site: www.lglass.com
Price: £29.99
PC Pilots rating: 3 out of 5

Software Title: Pro Pilot 99
Publisher: Sierra/Dynamix
Web site: www.sierra.com/dynamix
Price: £39.99
PC Pilots rating: 3 out of 5




Weather RADAR20



Cessna over San Francisco



Hawker Flight Management System

		Price: £39.99(RRP) Release Date: Out Now
Publisher: Take 2 Interactive	System Requirements: Minimum - Pentium 200MMX, 32 MB RAM, 4X CD, 400 MB hard drive space. Recommended - Pentium II 333MMX, 64 MB RAM, 24X CD, 1.6 GB hard drive space. Review PC: Pentium II 400 Mhz, 128 MB RAM, STB Velocity 4400 PCI 16 MB graphics card, 32X CD-ROM drive and SoundBlaster 16. Viewed through a 19" monitor.	
Developer: TRI		
Tel: 01753 854444		
Web: www.flytri.com		
Difficulty: Moderate		
No of Players: Multiple	Pros: Superb clouds. Excellent flight modelling and instrumentation. Great sound, very good ATC and AI aircraft, good multi-player environment and 3D support. Very good scenery within the five featured areas. Cons: Outside the featured areas, the low-altitude scenery is lacklustre. The oversized instrument panels can be frustrating. Very slow performance without 3D video acceleration. A number of bugs and reported problems.	

Airline Simulator 2

Simulation or Reality?



The Shorts 360 is just one of many aircraft on offer



The primary and secondary panels of the new 747-400.



B747 secondary panel

Those who have followed civilian flight simulations for a long time will instantly recognise Airline Simulator 2 (AS2) as the latest incarnation of a classic program called Airline Transport Pilot (ATP).

This edition includes all the original aircraft and scenery as well as the enhancements known as the 3D Advanced Graphic System (3DAGS). Also included are the former add-on European scenery and the USA East and West scenery. The most important addition to this version are the totally rewritten flight models for the three primary aircraft, namely the MD-83, MD-88 and B747-400.

One of AS2's recent advertisements says it all: "Only experienced PC pilots should apply!" This simulation is not for the casual flight user. It will appeal only to those who appreciate a challenge or those who dream of being real airline pilots.

Although AS2 and Microsoft Flight Simulator share a little of the same heritage, there has been an on-going debate between their respective admirers. The Microsoft fans feel that some compromises with reality can be justified in the interest of having fun. The ATP/AS2

fans argue that, when attempting to simulate reality, there should be no compromises.

If you're used to hopping in a plane, hitting full throttle, and heading for the sky, forget about it here. Unless you advance the throttle correctly on takeoff, you are likely to get a "stabiliser" warning. Unless you've studied the manual first, you're likely to receive constant warnings about flap positions, bank angles, impending stalls, and so on.

Only experienced PC pilots should apply!

This is a tribute to the ruthless realism of AS2. If you can accomplish even a short hop without any warnings, you should be proud indeed. We know, because it took us several tries just to fly from San Francisco to Oakland (just across the bay) without constant alerts.

The MD 83 primary panel is detailed, yet easy to use.



The one worrying aspect of the no-compromise philosophy is the AS2 approach to joysticks or flight yokes. PC flight simulation programmers understand that computer joysticks have limitations. For example, the average analogue joystick will report around 1,000 values between full back (up) and full forward (down).

That sounds like a lot but, because the elevator will travel through a range of about 50 degrees, each joystick value will

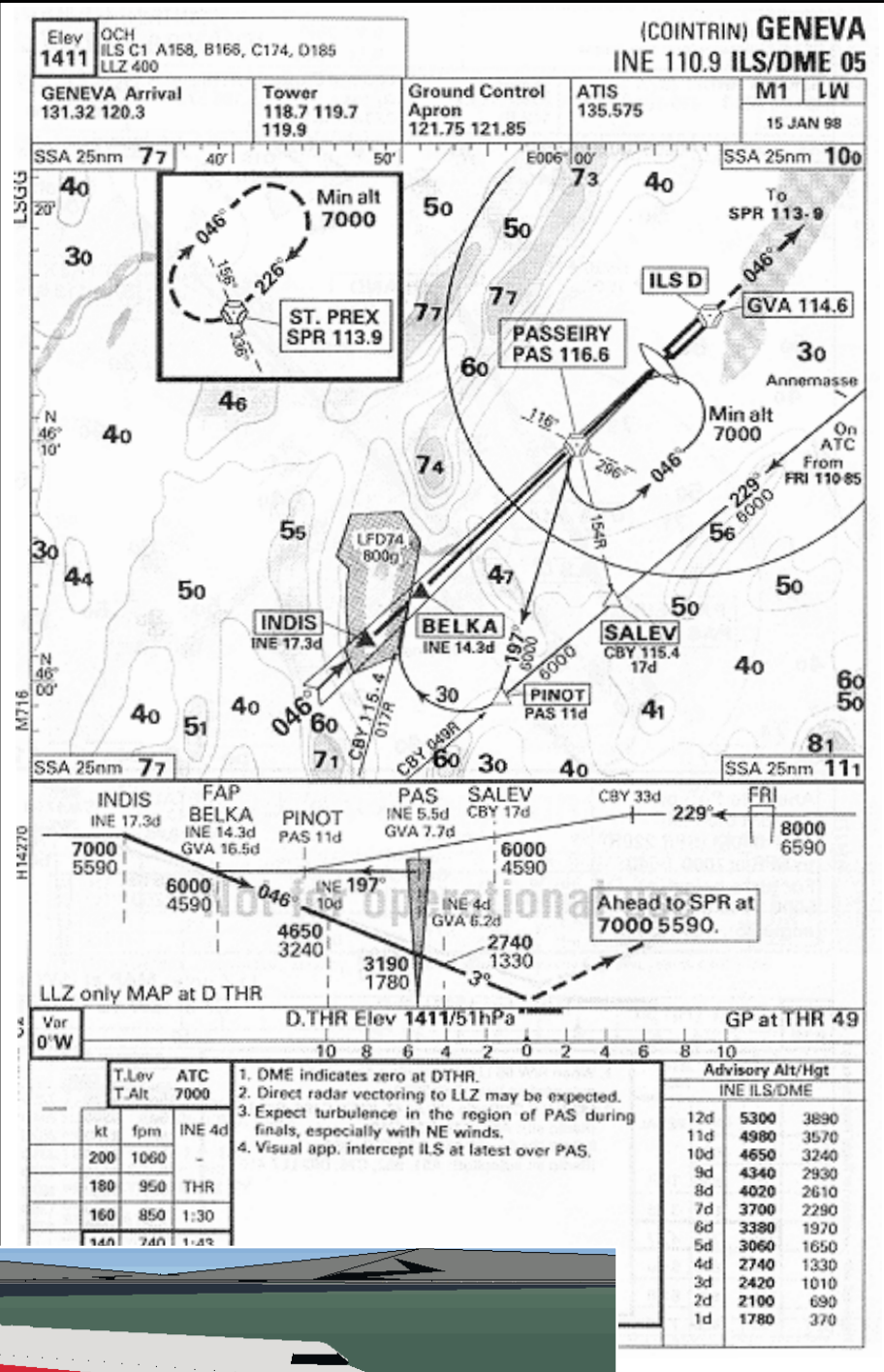
represent only about a twentieth of a degree. In the real world, airline pilots will often use the joystick to make corrections of five-thousandths of a degree or less. To compensate for this, most simulations program the stick response to take account of the gross limitations of plastic joysticks. AS2 has not done this and the result is stick response that the average simmer will not understand.

The most noticeable symptom of this phenomenon is an oversensitive stick. Pilot-induced vertical oscillation of the nose, or "porpoising", is much harder to avoid than in most other simulations. Luckily the sensitive stick will force the pilot to use trim more often to fly the aircraft. This is the way airliners are flown in the real world. Careful attention to trim and reliance on the autopilot mean that, most of the time, airline flying is a hands-off proposition.

If you are looking for instant enjoyment you will be sorely disappointed with the stick response. AS2 would hold much greater appeal if an "easy stick" option was added. At least this would allow beginners to get accustomed to the other myriad details without experiencing unnecessary stress.

There are, at least, many positive aspects to AS2. Perhaps foremost among these is the improved flight modelling. Previous simulations such as ATP and the original Airline Simulator suffered from their lack of inertial modelling. In the real world moving objects are characterised by

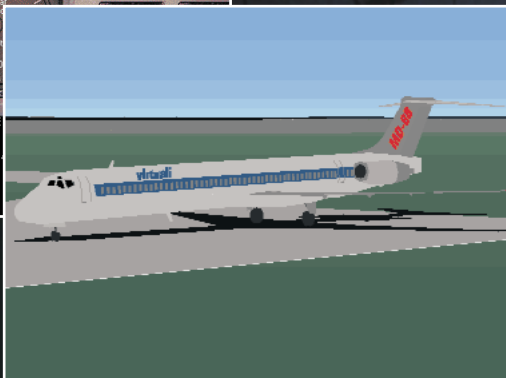




AS2 includes plenty of approach plates, which helps justify its high price.



The exterior views of the 737 (above) and the MD 88 (right) clearly show that AS2's graphics are not its strong point.



ALSO CONSIDER

- Software Title:** 747-400 Precision Simulator
Manufacturer: Aerowinx
Web site: www.aerowinx.com
Price: £149.95
PC Pilots rating: 4 out of 5
- Software Title:** X-Plane
Manufacturer: Lamina Research
Web site: www.x-plane.com
Price: £139.00
PC Pilots rating: 3 out of 5
- Software Title:** Flight Simulator 98
Manufacturer: Microsoft
Web site: www.microsoft.com/games/fsim
Price: £39.99
PC Pilots rating: 4 out of 5

inertia, one aspect of which is the tendency to remain in motion. When you move the nose of a real aircraft, it keeps moving unless you correct it to make it stop.

In the earlier incarnation of Airline Simulator, except for the inevitable "porpoising", you pointed the nose and it immediately stopped, like an arcade game. The new flight models display more realistic inertia, even to the point of slightly improving the porpoising. However the new flight modelling has only been applied to the three newer aircraft. The original ATP aircraft (B737, B767, B747-357, A320 and Shorts 360) still fly like Pac-Man.

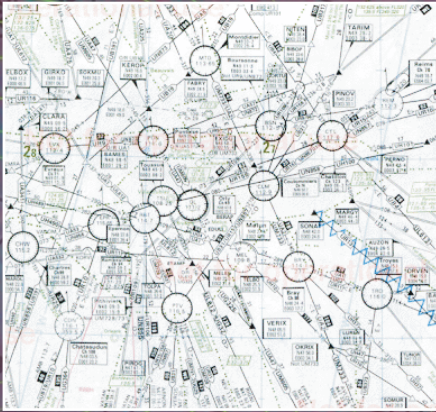
The new flight equations are impressive. They are based on true airflow calculations and can even induce single-wing stalls. They also keep track of the stresses on the airframe. If these accumulated stresses cause a part to fail, the aircraft immediately begins to behave accordingly.

If you are looking for instant enjoyment you will be sorely disappointed

The flight model also reacts to weather parameters. Changes in ambient air temperature, for example, will affect the aircraft's flight characteristics.

In all, the flight modelling in AS2 is good, even though the joystick response doesn't always show its true potential. The developers of AS2 have paid great attention to the flight model and should be commended for it.

One area in which AS2 really shines is the instrumentation, as should be expected from a simulator obsessed with realism. Of particular note, the autopilot simulation is more accurate and detailed than many other simulators. The designers have taken great pains to apply their philosophy of realism to the instruments.



Although not huge, the Aerad charts are a nice inclusion.

Other simulators will often update instruments at an unrealistic rate. The instrument update rate of AS2 is another touch of realism that forces the pilot to "think ahead of the plane." For each aircraft, all key instruments are situated on two panels that can be quickly swapped with the Tab key. This is a better panel system than some other simulators provide, and it makes cockpit management easier than it might otherwise be.



St. Louis Arch

Another noteworthy facet of AS2 is its sound reproduction. In the real world, sounds can provide critical information to a pilot. Accordingly, AS2 delivers lots of high quality auditory data. Engine spooling, flaps, spoilers and landing gear sounds are all nicely done. Likewise, marker beacons and other navigational aids employ realistic sound modelling.



AS2's scenery really excels as night approaches, bettering many competitors night effects.

Warnings are often supplied by sounds, both mechanical and human. If you're not flying correctly, you will be besieged by horns, buzzers and recorded female voices. Simultaneously, your co-pilot will constantly be reporting the status of gear and flaps or asking you to check your altitude, airspeed, heading, and so on. When all this is combined with the realistic Air Traffic Control, the cockpit can become quite noisy!

The scenery, compared with other recent simulators, is far from spectacular. Some might say awful. Although capable of displaying 256 colours, the AS2 scenery is often flat, devoid of much detail and characterised by non-textured polygons.

At least this simplicity produces very good frame rates. Other simulators pay for their fancy scenery with jerkiness and hesitation in refreshing the screen. With AS2, motion is smooth and this will please those with slower computers. Another positive aspect of the scenery is that there is lots of it. By amassing all the previous ATP add-ons, the virtual Earth has been covered with simple, but effective, scenery.

On the scenery side AS2 provokes a mixed response.

Realistic cockpits and lots of scenery is not all you get for your money. Included in the package is a well-written, 192-page users manual plus another 156-page book of detailed approach plates and terminal diagrams, covering Europe and the North Atlantic. If this weren't enough, AS2 also provides two large glossy cardboard checklists for the B747 and MD-83/88 and several large and detailed navigational charts. A simulator devoted to realism should provide sufficient technical information and AS2 does a good job in this regard.

So should you buy it?

The designers have generally succeeded in what they set out to. They have taken a classic and significantly improved it. Those interested in flying the "Big Iron" will find AS2 to be a valuable addition to their simulator libraries. Although it is not perfect, neither is any other contemporary flight simulator.

Sport pilots and dabblers will undoubtedly not find it to their liking.



The primary and secondary panels of the MD 88

The joystick response will produce frustration and consternation among many. Given the current obsession with "eye candy," AS2's spartan graphics will not appeal to some. Even those dedicated to realism and airliners may find it a bit expensive.

Still, for what it purports to do it has few, if any, equals. Its realism is such that is quite likely that future airline pilots may have started out on AS2. In the future there may well be an AS3 that will be even better – for now though, with its current incarnation you'll either love it or hate it.

Chuck Dome

	Price: £99.99 Release Date: Out Now
Publisher: The Associates Developer: Nomissoft Tel: 01480 462748 Web: www.nomissoft.com Difficulty: High No of Players: Multiple	System Requirements: Minimum - 486 100Mhz, 8 MB RAM, VESA 1.2 compatible 1 MB video card, SoundBlaster compatible sound card. Recommended - Pentium 233MMX, 32 MB RAM, ATI 3D compatible video card, SoundBlaster 16 compatible sound card.
Pros: Superb flight modelling and instrumentation. Excellent simulation of the airliner cockpit environment and of Air Traffic Control. Excellent sound reproduction. Very good frame rates. Lots of approach plates and navigational charts for Europe and the North Atlantic. Thousands of airports and navigational aids.	Review PC: Pentium II 400, 128 MB RAM, STB Velocity 4400 PCI 16 graphics card and Creative Labs SoundBlaster 16 sound card.
Cons: Unspectacular scenery. Non-standard joystick support. Expensive. Difficult interface. Off-putting for beginners. Expensive.	

Hangsim — the first true

light aviation simulator flies in

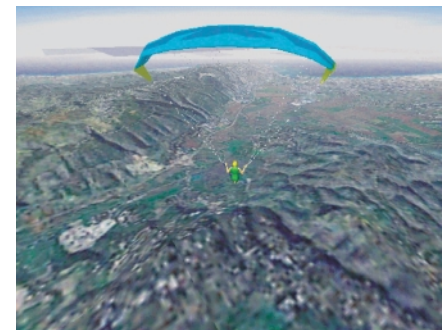
Warning: toned muscles, good reflexes and bird-like instincts needed (translation: good mouse-to-eye coordination and adequate hardware highly recommended)



You won't get this look and feel of Hong Kong any other way.



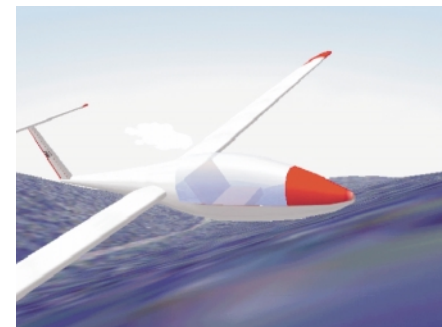
The interface is sharp and well designed.



Experience the real haze as you paraglide to Haifa Bay.

Freedom, wind through the hair and a feeling of leaving the world behind comes to mind when contemplating the idea of hanging between sky and ground.

This was probably what "pushed" man to jump off cliffs with wooden boards tied to their arms only to desperately flap their way to painful death. We'll never know all their names but they all had the same dream - that of flight.



The sailplane almost touching the ground - notice the transparent cockpit (but where's the pilot?)

Today, if you live near cliffs or gentle hills, you may notice at weekends the colourful mosaic of hang gliders and paragliders dotting the sky. Have you ever wondered what it's like to fly one of these "human kites"?

Perhaps the prospect makes you nervous, but Hangsim, claiming to be the first light aviation experience simulator may make the jump more palatable. There are, after all, hang gliders, sailplanes and Ultralights for Flight Simulator 98 on the Internet, so why should this be any different?

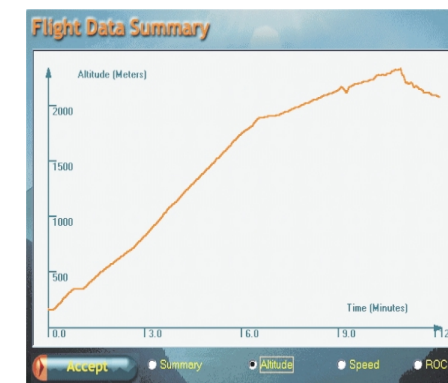
For starters, with hang gliders and paragliders you do not have a joystick or a yoke or instruments to complement your senses. You control them with your body weight, hands and muscles. You use your experience to point them towards the flight goal and bring yourself back safely to the ground.

We started with a Hang Glider from the aircraft list and chose Verdun as a flight location for its high, steep mountains. Thus, located on one of the cliffs, we were ready to jump. Running for a short distance to build some lift and we 'fell' off the cliff towards the valley below... Prepare yourself for some fantastic visuals in Hangsim. Wind sound, fluffy clouds and high-resolution photo-realistic scenery

bring a real sensation of hanging in the air. The scenery is of a highly accurate 'mesh' type, covered with true colour (16 Bit) aerial or satellite photography and dotted with 3D objects.

It is difficult to retain control of the glider while watching the graphics. It is instinctive to pull the mouse to climb and push it to descend, but doing so gets the wrong results. The mouse simulates the movement of your body's centre of gravity, and is the only way to control the direction and the speed of a glider. Therefore, push is for climb, pull is for descent; left is for right and right is for left. It can be confusing and takes about 10-15 minutes to get the "hang" of it.

For those of you suffering of "Joystick Addiction Syndrome", Hangsim offers the option of control with a regular joystick. However, for a realistic experience, use a mouse for the hang glider and paraglider and a joystick for the Sailplane and Ultralight.



All flights are monitored and the performance can be reported in chart format



This is mesh scenery at its very best

The attention to detail is extraordinary - you can see the pilot's face, the struts and the shiny wing surfaces with full and realistic shading. The hang and paraglider pilots are also animated - you can see them run, bend and move their bodies depending on the stage of flight. This animation is definitely a flight simulator first.

The Ultralight is easier to control - after all, this is a "real" aircraft relatively speaking - and has an engine and is joystick-controlled. After a short roll on the ground you are airborne. The high-resolution terrain and bitmapped objects allow for excellent visibility and detail, even at 100 ft above the ground.

The high speed, low-flying sensation is definitely there. The optional minimal flight instruments (available for all aircraft) come in handy, allowing for more accurate manoeuvres. You can also use a variometer (a device which indicates the direction of the vertical speed by varying the pitch of the sound it emits) This way you can concentrate on flying and not on scanning instruments - you simply hear changes to your vertical speed.

A Short Guide To Hang Gliding History

In the late 1940s, Gertrude and Francis Rogallo attempted to create a flying machine that would allow flight from a fixed point such as being pulled by a rope. By using this drag principle and with photographs to prove it, the couple were awarded a patent in 1948 for such a machine and the first paraglider was officially born.

Early commercial trials were not successful, but the Cold War and the Space Race saw serious research in paragliding re-established. However, after early promise, this renewed interest in paragliders faded away.

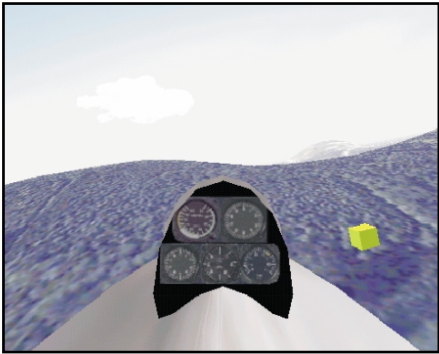
A handful of enthusiasts, however, seeing the prospect of cheap personal aviation kept the flame burning. One of them, the Australian John Dickenson saw the flexi-wing idea while browsing through a magazine. As he was preparing for the Jacaranda Festival he decided to build a different type of "kite" - one that will allow him to fly freely.

The flat wing designs of the 'human-kites' were the cause of many accidents at the time. The flexi-wing profile allowed him to change the traditional design and on September 1963 the newly designed kite performed its first flight. It was the first hang glider.

Pictures that appeared later in the newspapers of the day show the typical A shape of the control frame. The following months saw major innovations in the hang glider's concept and on October 11th 1963, John Dickenson was awarded a patent for his invention.

If all this sounds wonderful, but rather pointless, then you' ll be interested in the challenges and 'games' included.

The Ultralight can be armed with rocket launchers to shoot down opponents! These are not laser-guided weapons, just a simple aim and shoot variety forcing you to be a good pilot and hunter. The program allows for a multitude of options for different opponents, skills, aircraft and mission set-ups. Opponents can take on different tactics - flying around you or others will play "follow the leader" and others will simply try to knock you out of the sky. A flexible Dynamic Scenery menu allows lots of varying set-ups.



Race toward the first waypoint in the Sailplane.

Ilan Papini - The Man Behind HangSim

Q and A with Ilan Papini - The Man Behind Hangsim



For the last 18 months Ilan has been turning a dream into reality. An aeronautical engineer by training and accomplished programmer since his University days, Ilan has been involved with flight simulation since the advent of Microsoft's Flight Simulator. What makes him tick and how is such a promising product born? Ilan's acquaintance with hang gliding started in 1985 when he designed, built and flight-tested his own custom-made hang glider. After going through formal hang gliding training, he became an active hang glider pilot for five further years during which he developed his own twin engine power kit for hang gliders. He's also a licensed pilot and continues to fly on "conventional" aircraft as a private pilot.

What pushed you to single-handedly develop Hangsim for more than a year now?

The market is flooded with quality simulators. Have you ever dreamt of competing with them?

Hangsim is the product over a year's single-handed development, what pushed Ilan to try and compete in a market already heavy with quality simulators?

"I guess that by now it is obvious that everything I am and do is somehow connected to aviation or flight. I know enough to recognise when a flight simulator gives me just motion in 3D instead of a real flight sensation. I usually test the flight dynamics of these programs extensively and it disappoints me time after time to discover that stalls are not as they should be, spins are not spins and the cockpit confines you to "tunnel vision".

"There are some very good simulators on the market but none came close to what I expected. This feeling of uneasiness grew in me for years until I decided to write my own flight simulator, regardless of what was happening on the market. It was a personal challenge."

We asked Ilan how is his approach to flight simulation different from others:

"Hangsim is a new type of flight simulator, it is meant to be as close as possible to the feeling of free flight. Since other flight simulators tend to model fast or heavy aircraft, the real feeling of free flight is not common on a PC."

Hangsim came to life over a period of 18 months. Ilan started with a wish list stating the most important things he wanted from his flight simulator:

- very low altitude flight over realistic scenery with excellent visibility and resolution.
- spherical virtual cockpit - the ability to look in all directions at all times
- high frame rates
- real flight and environment sounds
- good flight dynamics with good handling in extreme manoeuvres.
- atmospheric model allowing for correct winds and buffeting effects dependent on topology

Ilan explains,

"The initial development phase took around six months and soon it was clear that the product would come to life as defined. Successive versions relied extensively on user feedback and were constantly tested and fine-tuned by real pilots. The result was a model that performed to specifications. Soon I started working on the commercial version with Wilco, who were the first in the industry to realise the potential of Hang Sim."

When asked about what advice he would give to other budding simulation developers, the developer of Hangsim is ready to proffer a severe warning:

"Developing a new Flight Simulator on your own is not easy and not recommended! It takes team effort, massive user feedback and testing to get a product off the ground - not to mention money. The knowledge needed to plan and develop a flight simulator is vast. You need to own your equipment and tools. If you are not an aeronautical engineer, don't even think of starting programming alone! Flight simulation is not a game anymore. The audience demands the best in realism, accuracy, graphics and sound. With so many quality products around you need to be the best in order to have a chance to survive.

If all of the above apply, my advice is go ahead - create a dream simulation on your own, but be prepared for a long and hard process with much frustration and many sleepless nights - I work 16-18 hours a day. Raw determination may not be enough."

Another fun diversion are air races where you attempt to fly through waypoints and arrive at the finish "line" in record time. Your performance is monitored and logged and you can see the results on a charted summary. Hopeless navigators need not worry as race waypoints appear as targets in the sky so you simply fly towards them at the highest possible speed.

If it all sounds a little too easy then try flying a hang glider with swarms of android-driven kamikazes around you willing to knock you out of the sky to win the race!

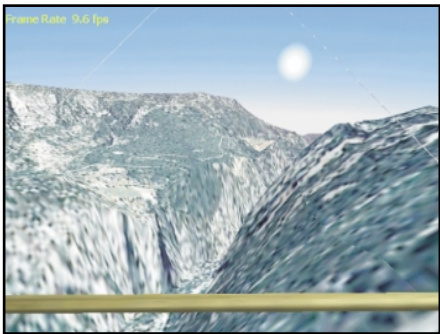
Hangsim is packed with features and options. You can control almost every aspect - flight model accuracy, weather, terrain resolution and so on. The developer, Ilan Papini refers to Hangsim as an "open, light flight simulation platform" - one that can be enhanced with scenery and aircraft by third party developers. The add-on interface is documented and open to anyone interested. It will be interesting to see what support Hangsim generates.



An aggressive opponent attempting to cut in

The use of a six degrees of freedom (6 DOF) flight model allows for manoeuvres and effects not normally available in flight simulation "games". It almost gives you a sensation that if you can fly Hangsim, you can control the real thing. Hangsim offers six different aircraft to fly. With the open architecture provided, hopefully we will see many more in the near future.

The weather engine models the airflow over mountains, ridges and into valleys. You have realistic thermals and "cloud-suck" effects that can turn an innocent flight into a nightmare. The fog/haze effect also is modelled accurately. The excellent weather model allows for a good learning



The wind in your hair (notice the frame rate)



Above the deep valley - one of the many external views possible



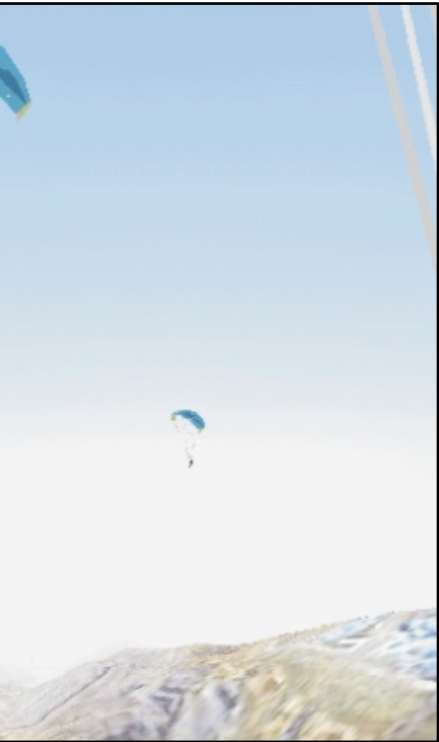
Another beautiful vision

curve. Stalls, slides, spins and other obscure effects are all there and are as realistic as can be expected. Flying schools could consider using Hangsim for teaching the basics.

There is a good variety of scenery to fly around such as deserts, high snow-covered peaks, gentle rolling hills covered with forests and deep valleys. Again, it is possible to add more scenery via the open interface. However, don't expect coast-to-coast covered scenery. This simulator is designed for short, low altitude flight, and needs highly detailed graphics.

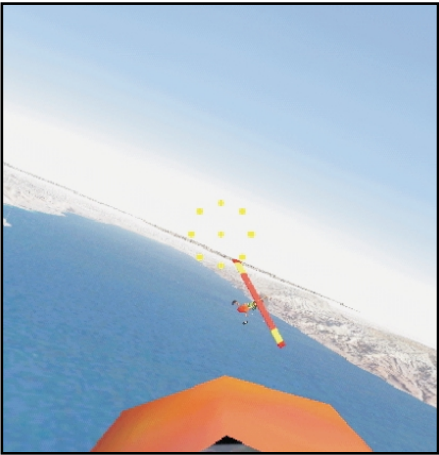


Time for a change - in the Ultralight over the Dead Sea - notice the haze effect



The paraglider flight is a breathtaking experience - an exercise in airflow control and hindsight

Locations include San Francisco, Hong Kong, Haifa and the Dead Sea in Israel, Lebanon, Verdon, Chamonix and other more general areas such as Orange County in California, all with plenty of 3D objects and at an excellent quality.



Dogfight over the Dead Sea - ready to launch your missile and down an opponent

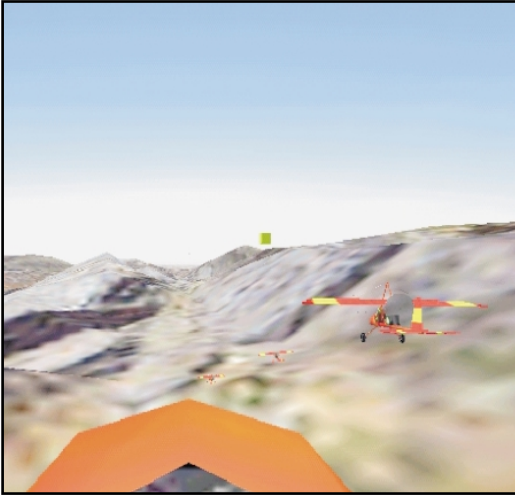
Beyond the accurate scenery borders, there is regularly tiled scenery to the horizon. For those who tend to lose their way, Hangsim also comes with GPS and a moving map. GPS has recently become standard equipment on modern hang and paragliders. The version recreated here is similar to the popular Garmin model.

Hangsim's graphics shine through. The 3D graphics engine can render 640x480 up to 1280x1024 in 16-bit colour. Of course you need the necessary hardware muscle to run it at those rarefied heights, though a humble set up can still be

satisfying enough. For example at 640x480 resolution, clouds off, medium terrain complexity and maximum visibility, it is possible to achieve 9-10 fps in window mode.

The stereo sound effects also add to the general feel of "being there" and help provide speed and movement cues.

There are a couple of deficiencies - at night everything has an eerie blue tint - not very life-like. It would also be nice to have a multi-player option, especially with the fun options available in single player. The possibility of an online race with some friends over steep cliffs sounds good fun to us!



Racing again against three others with a more potent tool - the Ultralight

Everything about Hangsim smacks of attention to detail. During the review it installed easily, ran smoothly and seemed fairly free of bugs. A breath of fresh air compared to many releases! Obviously Hangsim is a different experience entirely from flying 737s and may outwardly appear to be too simple for some. We found it refreshing to get back to basics, take a break from complicated ILS approaches and enjoy the freedom and enjoyment Hangsim offers. A shame about the lack of multi-player, but otherwise definitely a winner.

Alex Lawrence

		Price: £34.99
Publisher: Wilco Publishing		Release Date: Oct '99
Developer: Ilan Papini		System Requirements:
Fax: +32 2331 07.51		Minimum - Pentium 166, 3D Graphics Accelerator (Min 4MB RAM), 100 MB free hard disk space.
Web: http://www.wilcopub.com		Recommended - Pentium II 400, 64MB RAM, DirectX 6.0, TNT2 or Voodoo3 based 3D Graphics Accelerator (Min 8MB RAM)
Difficulty: Medium - High		Review PC: PentiumPro 200, 32MB RAM, PCI 3D Blaster (Rendition V1000 based) graphics card and Sound Blaster AWE64
No of Players: One		
Pros: Excellent flight models with great scenery, aircraft graphics and realistic sounds. Excellent weather model and options. Plenty of entertaining challenges. Possibility of third party add-ons.		
Cons: Unrealistic night effects. Needs decent hardware to live up to its potential. No multi-player mode		

Fly the Big One... 747-400

747 TECHNICAL INFORMATION

The Boeing 747-400 is the last variation of the Boeing 747 jetliners. Boeing originally designed the 747 in the 60s for military use, but decided to pursue the commercial aviation market instead.

At first sight you can recognise the 400 by looking at the 1.83m long winglets on the wing tips. A closer look will reveal differences in shape, wing span, engines and systems, but the major changes are found at the highest level, on the flight deck...

The main flight deck is designed for 2 crew. Inside the cockpit the main panel is equipped with six big CRTs (Cathode Ray Tubes). These contain a PFD (Primary Flight Display) and one ND (Navigation Display) for each pilot and two central EICAS (Engine Indication and Crew Alerting Systems). These systems ensure the workload of each pilot is reduced by half: a typical 747-400 has 365 lights, knobs and buttons!

The PFD provides detailed information about attitude, position, speeds, height and heading. The ND is able to display information about approach, VORs (VHF Omnidirectional Range - navigation beacons), map and flight plan patched in from the FMC (Flight Management Computer). Finally, the EICAS provides information about the engines, flaps, gear status and failure warnings.



Lufthansa 747 at Milano Malpensa

This collection includes 12 beautifully textured Boeing 747-400's in liveries from airlines around the world. The visual models are very accurate and show no design limitations often associated with large aircraft within Flight Simulator. The aircraft have a smoothly rendered finish giving a rounder appearance and are equipped with landing lights and moving parts. All are fully textured and there is no visible "bleed-through".

The manual gives very little help with speeds and configurations and there are no checklists or flight deck procedures provided. 160 kts is the recommended speed for takeoff or V_r (rotation off runway) and 180 kts is the recommended V_2 (safe climb speed.) This aircraft is like a giant flying brick - no rotation occurs before 175 kts, whatever the fuel load. Be warned that you will need a long runway!



FMC Window, Flight Plan loaded KLAX-KSAN (Los Angeles to San Francisco)

On the other hand the plane is easy to control. There are no bumps, no sudden attitude changes and the autopilot holds her steady. She's good in turns and overall flies smoothly and lands well.

We tested and discussed the flight dynamics with a real airline Captain and agreed that on this aircraft they are good enough to simulate the feeling and behaviour of the genuine article.

The instrument panel includes 8 separate panels for multiple viewpoints. Just by clicking in a few sensitive areas you can easily access any part of the flight deck. Navigating around is quick and one can access all the instruments needed. Most of the instruments physically work, though there are a few dummies.



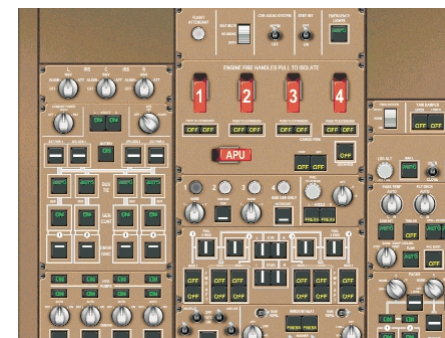
Undercarriage and shape details

ALSO CONSIDER

Software Title: First Class Boeing 747-400 Glass Cockpit
Publisher: Apollo
Web site: www.apollosoftware.com
Price: £34.99
PC Pilots rating: 4 out of 5

Software Title: 747
Publisher: Data Becker
Web site: www.databecker.co.uk
Price: £19.99
PC Pilots rating: 2 out of 5

The Captain's view automatically scrolls down when you reach a pre-set decision height in order to give you maximum visibility during final approach.



Overhead Panel

The PFD and ND are very accurate and easy to operate, although the manual is too brief to be much help with learning the various systems. The CRTs are rendered in sharp, clear graphics and can be adjusted for brightness or switched on or off. They are fully functional and work with the FMC and GPWS (Ground Proximity Warning System).

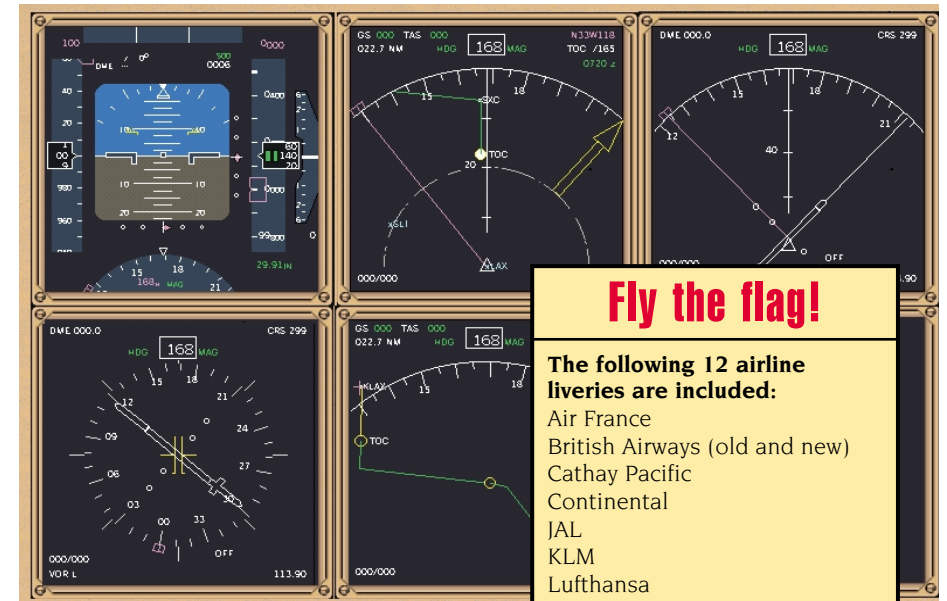
The FMC also works well and has a large area of the manual dedicated to its various operations. A flight planner is included which allows you to edit your route and load it directly into the FMC. When on board you can amend and adjust all flight plan details as you want. TOC and TOD (Top Of Climb and Top Of Descent) points can also be generated - just remember to set the right performance figures because your flight plan can be automatically executed and flown by the simulator too!



Left panel



Jump seat panel



Fly the flag!

The following 12 airline liveries are included:

Air France
British Airways (old and new)
Cathay Pacific
Continental
JAL
KLM
Lufthansa
Qantas
Singapore Airlines
United Airlines
Virgin

CRT Modes

The GPWS will provide you with audible warnings during flight including take off, ascent, landing configuration, wind shear and ground proximity. The overhead panel includes fire handles, starter switches, anti-ice, pitot heat, fuel selectors and light switches, all of which are accurately working models. The start-up operations are fast and simple, you can choose between manual and auto-start.



Take Off from LIMC

Unfortunately this complete 747 package does have some major flaws; the inclusion of a complete manual, checklist, operating procedures and information provided about the operation of the CRTs (you must know what you are doing or buy a manual) would have been helpful. Some of the EICAS information (e.g. failure warnings) are not shown. The start-up procedure, fuel settings and APU (Auxiliary Power Unit) operations could be improved upon and the PFDs do not work with popular 3D cards like Voodoo 1 & 2.

On the other hand the software provides some unique features and functionality, with a large database for your flight plans and good planes with custom sounds. It is also extremely good value for £20.

You will fly this 747 for a long time, spending hours on "hard" IFR flying and navigation, discovering all the hidden details and improving your skills. If you like glass cockpits, airline operations, moving maps, IFR navigation, buttons, knobs and so on, you should fly this one.

Angelo Moneta



Central Stack



High Visibility during final Approach

		Price: £19.99 Release Date: Out Now
Publisher: The Associates Developer: Flight One Software Tel: (01480) 462748 Web: www.flightsim.co.uk/ Difficulty: Medium - High	System Requirements: Minimum - Pentium 233 MMX, 50 MB hard drive space, 32MB RAM, Video card capable of displaying 800x600 resolution. Recommended - Pentium 300, Open GL standard video graphics card displaying 1024x768.	Review PC: P-III 500MHz, 128MB RAM with 16MB Voodoo 3000 AGP. Flight Simulator 98 at 1024x768.
Frame Rates: Flight Simulator 98 at 1024x768. No noticeable reduction in frame rates were detected while using this product.		

Mad Dog

Another generic aircraft add-on or something new?

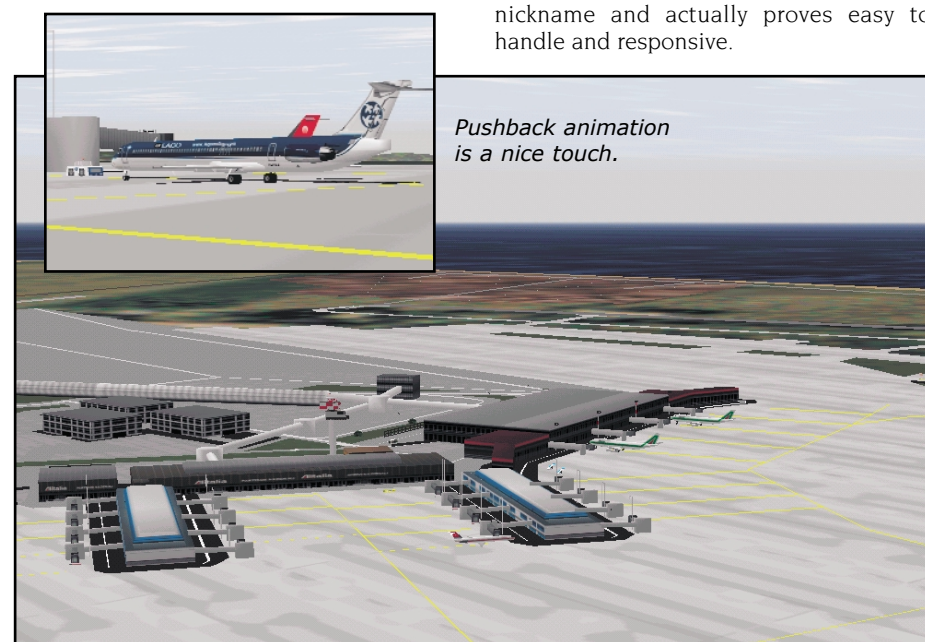
The past months have seen numerous releases of aircraft and panel add-ons for Flight Simulator 98. Although a few have proven worthy of purchase, many have fallen short of simmers expectations.



The expert panel, will be the choice of those ready for a challenge.

Mad Dog is so titled from the nickname used by pilots for the MD-80 series of aircraft. This latest package for Flight Simulator 98 includes models of the MD-81, 82, 83 and 88 aircraft and panel, and surpasses the quality of any previous product of its type. Furthermore, Mad Dog includes themed scenery for use with its aircraft and panels, adding to the overall experience.

The thing you will notice is that Mad Dog is well documented with separate manuals for the panel, test flights and a flight checklist. The test flight manual not only guides you through a test flight, but acquaints you with



Detailed scenery around the primary airports is attractive.

the layout and functionality of the panel. The flight checklist is almost a manual in its own right providing quick reference to commands required to operate the panel. Actual operations are covered in more detail by a comprehensive and chunky booklet.

An intuitive set-up wizard makes installation easy, but it is tedious as there are over five pages of options – for which planes and panels you wish to install. The program checks to ensure you have the correct Microsoft Converter and Patch Set installed, but annoyingly does not install them automatically if they are missing – forcing you to search the Mad Dog CD manually.

Although tempting to jump into one of the new aircraft and set off, the manuals suggest that you follow the Test Flight Manual and perform a flight with the standard panel for their first flight. This is a useful way of familiarising yourself with the many panel features and procedures.

Overall, the external visual models of the MD-80s are designed well. The only real disappointment is that when viewed from either end, the planes appear to be six sided, rather than smooth. The textures on the aircraft are at least cleverly applied to reduce this deficit from other views and angles. The flight model is excellent. The simulated aircraft belies its odd real-life nickname and actually proves easy to handle and responsive.

Pushback animation is a nice touch.



Watch out, there's a Mad Dog at the gate!



The standard panel is relatively easy to use, yet accurate.

Themed scenery helps create a rounded package, with a demo version of the excellent Italy 98 and additional active scenery that provide other artificial air traffic. Although the scenery is well designed, detail outside the airports is not very high except for 140 plus landmarks that have a photographic appearance.

One nice element is the inclusion of a pushback procedure (where the aircraft is pushed away from the gate, prior to starting its engines). A moving truck and person move your plane to a user-designated spot on the tarmac.

Mad Dog is an excellent product. Not only is it highly realistic, it has also been designed to provide an enjoyable experience for novices too. Naturally, if you are looking for variety, the limited aircraft choice and high price may put you off. But those who are looking for a realistic and complex MD-80 for Flight Simulator will not be disappointed.

Brian McWilliams

		Price: £34.99 Release Date: Out Now
Publisher: Lago Developer: Rodolfo Arata Tel: +39 31 241444 Web: www.lagoonline.com Difficulty: Intermediate No of Players: 1	System Requirements: Minimum - Pentium 166, 16 MB of total RAM, 40 to 70 MB of free hard disk space, CD-ROM drive. Recommended - Pentium 200 MMX, 32 MB RAM, 3D graphics card, monitor capable of 1024x768 resolution or ideally 1280x1024.	Review PC: Celeron 300MHz, 128MB, 8MB Matrox G200 AGP and 4MB Maxi Gamer 32 3Dfx Voodoo video cards.

ALSO CONSIDER

Software Title: The Triangle
Publisher: Lago
Web site: www.lagoonline.com
Price: £34.99
PC Pilots rating: 3 out of 5

Software Title: Dangerous Airports
Publisher: Abacus
Web site: www.abacuspub.com
Price: £34.99
PC Pilots rating: 2 out of 5

Follow the river for the most breath-taking views Flight Simulator has to offer

White knuckle flights...

LOCAL BIRDLIFE



The USAF desert version of the Spitfire, ideal for dogfighting among the rocks



The Cessna 206 Stationair is a trusted workhorse in the area



For sightseeing trips, the quiet, high-winged Twin Otter Vistaliner is the ideal choice



For the brave hearted, the Bell 403 is a real handful to tame

There are few places in the world which belie their majesty more than a certain 277 mile stretch along the Colorado river in North Arizona. Speak to anyone who has been lucky enough to survey the Grand Canyon in all of its natural glory and they will say that their photos cannot hope to convey the splendour of this wondrous natural sculpture.

Wilco Publishing have therefore been brave in choosing this area for the first in their Reality Flights series of add-ons for Microsoft Flight Simulator 98 and Combat Flight Simulator.



Grand Canyon airfield is one of 8 strips to get the Airport 2000 treatment

Covering some 32,000 square kilometres of scenery, including Las Vegas, the Hoover Dam and all local airfields, this Grand Canyon add-on is as comprehensive as we could have hoped for. And the level of detail certainly is astounding! Using the same photo-realistic rendering as Airport 2000, the airfields are not only accurate to the last hoarding, but they are also teeming with other air traffic, ground vehicles and even people. The atmosphere generated is one of a busy tourist area - which it is of course, coping with around five million visitors every year.

Four new aircraft native to the region can be flown: Cessna 206 Stationair, De Havilland Twin Otter Vistaliner, Bell 430 helicopter and an USAF Spitfire Mk Vb.. Each is complete with a painstakingly recreated panel and fully legitimate flight model. There are five ATC adventures for the area, which take you on a tour of the major sightseeing hotspots complete with running commentary. But just like a London sightseeing bus tour, it can begin to grate after the fourth or fifth time around. This is soon forgotten, however, as you take-off from one of the wonderfully sited airfields

Grand Canyon

Satellite imagery and aerial photographs have helped to reproduce every inch in staggering detail

around the Grand Canyon and teeter towards the lip of the mile deep chasm.

How low can you go?

The red rocks of the Canyon look remarkable, undulating towards the horizon in a most natural way. Over 3,000,000 elevation points have been used to model the topography and the effect is breathtaking. To reinforce the feeling of awe, lighting effects including sunset, sunrise and lengthened shadows along the mountainous valley walls are used to wonderful effect. It is testimony to the developers' skills that they have managed to make the scenery come alive in such a fashion.

Unfortunately, a major downside to this absolute detail is that frame rates can suffer badly. Even on a PII-450 with the latest 32MB ATI Rage Fury video card, it is a struggle to obtain rates above twelve frames per second in the most detailed areas. Reducing the detail level to Sparse or Very Sparse helps matters, but detracts from the overall experience. In Combat Flight Simulator frame rates stay pretty constant with different detail settings, but still struggle on the mightiest of machines. Dogfighting among the canyons is certainly a blast though, so lowering the screen resolution is an option well worth considering, although even this only has a limited effect.

To help with navigation, an excellent, double-sided colour flight chart and approach plates are included which are themselves beautiful in appearance. Unfortunately, while Grand Canyon is perhaps the most revolutionary scenery add-on to date, it may be a too heavyweight for those without the latest hardware.

Kenji Takeda

		Price: £24.99 Release Date: Out Now
Publisher: The Associates Developer: Wilco Publishing Tel: (01480) 462748 Web: www.flightsim.co.uk/ Difficulty: Easy	System Requirements: Minimum - P166, 32MB RAM, 4x CD, DirectX-compatible SVGA. Recommended - Pentium II 266, 8x CD ROM, 64MB RAM, fast 3D accelerator card (Voodoo 2/3 or Riva TNT2)	Review PC: 300MHz, 64MB RAM with 8MB Matrox G200.

Frame rates, averaged to nearest integer:
 Flight Simulator 98 at 1024x768:
 Very Dense = 13 Normal = 14 Very Sparse = 17

X-Plane X-Pansion

The 4th dimension...

X-Plane has been known as the flight simulator with the best flight characteristics, the most advanced and functional instrument panels and the worst graphics. And yes, if you're looking for a realistic instrument approach trainer, graphics shouldn't really matter. But a part of every simmer's soul just wants to watch him/herself managing a brilliant flare with a 747-400 at JFK, or going for a sunset spin in a trusted Boeing Stearman over the San Francisco Bay. So X-Plane as it stood didn't ignite much passion.

X-Plane 5 then entered the "fourth dimension", providing a photorealistic textured terrain and extra aircraft to challenge the competition.

And now comes the X-Plane X-Pansion CD. There's new aircraft with realistic textured flight exteriors and original instrument panels of airliners, business jets, military and general aviation aircraft, helicopters and others. Also included is new photo-



realistic scenery of Europe, with special emphasis on France, Belgium, Switzerland and Germany. 7,000 airports, 16,000 nav aids and 22,000 intersection points are gathered together into one database.

There is also a series of adventures with detailed flight plans, such as a daring flight across the Alps in the middle of a

snowstorm, finishing with an instrument landing at Geneva.

X-Plane X-Pansion works with new X-plane Version 5 as well as the older Version 4, now called "Classic". Unfortunately the aircraft and terrain textures are only available under Version 5, which again only runs on systems with a X-Plane compatible OpenGL graphics card. Under Version 4 you can use the new aircraft, airports and adventures, but you will have to live with the "historic" un-textured X-Plane world.

If you like X-Plane then overall this title is very tempting, especially if you have the newer X-Plane version.

Marc Suxdorf

	Price: £24.99 Release Date: Out Now
Publisher: Wilco Publishing Developer: Not Known Tel: +39 31 241444 Web: www.wilcopub.com Difficulty: Easy No of Players: 1	System Requirements: Minimum - Pentium 100Mhz, 16MB Ram, CD-ROM, 16bit Soundcard, graphics card with 16bit colours and 800x600 resolution. Recommended - 24MB RAM
Pros: Brings the aircraft and scenery versatility of Microsoft Flight Simulator to X-Plane Cons: If you don't have Version 5 with an OpenGL 3D graphics card, X-Plane X-Pansion will only give you half the excitement.	Review PC: Celeron 300MHz, 128MB, 8MB Matrox G200 AGP and 4MB Maxi Gamer 32 3Dfx Voodoo video cards.

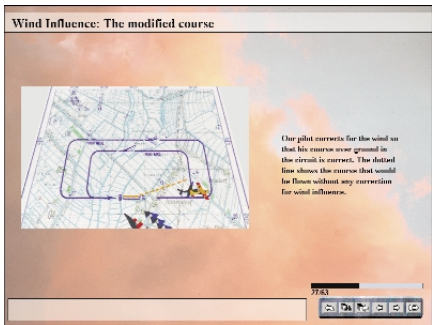
APAS Interactive Pilot Training

The virtual pilot instructor?



Demonstration of wind influence on objects

Studying for a pilot certificate is an exciting and demanding task, but for the dreary book work. Being taught by a person, in a real world situation, is more effective and fun. This is the thinking behind this product. APAS is a group of 4 German companies involved in pilot training. They might know heaps about



Computer animation showing how the pilot needs to compensate for wind influence

teaching people to fly but the appearance of this product suggest they know much less about software development.



Real video showing the take off phase of a single engine aircraft

This course of 30 interactive lessons covers the complete basic knowledge of pilot training. Each CD contains one complete lesson, which can be bought separately. The lessons are filled with colourful illustrations, animations and videos. Interactive tests during each lesson help you understand and summarise the complex material taught.

You can choose from a German or English installation. Because of the narrators strong German accent British users will be



Check procedures before takeoff

entertained by the English narrative. Charts, maps, airports and the like are in German, however the international standards for flight rules, training and publications ensure the lessons will suit all nationalities.

The big downside? The overall screen design and interactive features are boring and don't match the advanced multimedia we would expect in today's software. Creating such a comprehensive series is a big job, but with the visuals so dull you might as well save your money and stick to your books.

Marc Suxdorf

	Price: £29.99 Release Date: Out Now
Publisher: Aerosoft GmbH Developer: APAS Tel: +39 31 241444 Web: www.aerosoft.com Difficulty: Intermediate No of Players: 1	System Requirements: Minimum - Pentium 100Mhz, 16MB Ram, CD-ROM, 16bit Soundcard, graphics card with 16bit colours and 800x600 resolution. Recommended - 24MB RAM
Pros: A fun and easy multimedia way to learn the fundamentals of pilot training Cons: The screen design, multimedia and interactive features stink.	Review PC: Celeron 300MHz, 128MB, 8MB Matrox G200 AGP and 4MB Maxi Gamer 32 3Dfx Voodoo video cards.

Reliving history...

Over 80 years ago most people had never driven a car or even seen an aeroplane. "Aviators" were in the hundreds and the number of aircraft not much greater.

Aces High is a wonderful collection of over 100 First World War flying machines. The aircraft of the day were flimsy machines powered by unreliable engines with none of today's flying aids. Brakes, gyros or flaps to assist landing were a rare luxury. Nonetheless, feeling the wind force on the controls and in your face was a thrilling experience, as anyone who's flown such an historic aircraft will tell you.



Cockpit of Richthofen's Fokker DR1

The Aces High aircraft are bundled with historic scenery of the front lines, individual instrument panels and virtual cockpits plus 13 new flights that let you experience many of the daring situations the often-inexperienced pilots undertook. Included are the planes of heroes such as Manfred von Richthofen's flying cap. Although each plane has its own instrument panel, the exteriors are so unbelievably breathtaking, that it is impossible to fly longer than a few minutes in the pilot seat without changing back to



Richthofen's Fokker DR1

The handbook that accompanies the product is very detailed and includes screenshots of each aircraft type, with technical specifications and an in-depth description of its history. It also contains an historic and well-written tour through the First World War, with special emphasis on the pilot's point of view based on flight reports.

Although promoted as 100+ aircraft, actually there are 'only' 44 different aircraft types with multiple variants of the same model. Not withstanding, each are

Aces High



superbly built and show excellent attention to detail. Every stud and rivet appears to be in the right place all the way up to Manfred von Richthofen's flying cap. Although each plane has its own instrument panel, the exteriors are so unbelievably breathtaking, that it is impossible to fly longer than a few minutes in the pilot seat without changing back to



Short 184 Cockpit

spot plane view. One could spend hours "virtually" walking around the aircraft admiring the paintwork and searching for small hidden details.

Unfortunately, the aircraft interiors don't match the high standard exteriors. The cockpits correctly show the pilots view with cowlings, wing parts and weapon systems, but the instruments and gauges remain the same throughout the whole collection. They are partly taken from FS98 and appear to float over the top of their backgrounds; they simply do not match the rest of the panel. This mars what would have otherwise made Aces High a very special product indeed. Strangely, this collection does not come with an installation or support for Combat Flight Simulator. Still, Aces High is attractive for Flight Simulator 98 owners interested in early aviation.

Marc Suxdorf



DH9 Cockpit view

	Price: £24.99 Release Date: Out Now
Publisher: The Associates Developer: Various Tel: 01480 462748 Web: www.flightsim.co.uk Difficulty: Intermediate No of Players: 1	System Requirements: Minimum - Pentium 166Mhz, 16MB Ram, Minimum 15MB hard disk space, CD-ROM. Recommended - Pentium 266Mhz, 32MB Ram or higher, 3D graphics accelerator card, 113MB hard disks pace for full installation.
Pros: Over 100 wonderfully detailed historic aircraft, with new instrument panels, a great handbook and a perfect installation utility.	Review PC: Celeron 300MHz, 128MB, 8MB Matrox G200 AGP and 4MB Maxi Gamer 32 3Dfx Voodoo video cards.
Cons: The instrument panels don't match the aircraft's high standard. No installation for Combat Flight Simulator	

German Airports 3

A change of scenery?



Static aircraft and dynamic vehicles at Dusseldorf

Dusseldorf gate: notice the Automatic Docking System

stunning and it also scores well on accuracy and scenery density.

The detailed airport scenery does not seem to have an unreasonable impact on the Flight Simulator 98 frame-rate either. It is excellent. On a relatively humble PC we achieved 10-12 fps at landing, without any exceptions.

Each airport has "smart" gates, with either a human or automatic docking system. The static aircraft are either docked or are surrounded by service cars. Also depicted are cargo containers and luggage "trains". At some of the eight airports you can find parked cars and guests near the gates and on the "farewell" areas. The buildings sport impressive transparent glass effects that allow users to locate themselves inside the terminal.

At first glance, the dynamic scenery is disappointing. The only items that move are ground traffic and there are no aircraft taxiing around and taking off or landing.



Berlin-Tegel: tail paint job on the 777 is impressive



Ground level: B-777 being tended by service vehicles at Hamburg airport

German Airports 3 comes with two manuals, one with installation instructions and the second includes 43 Jeppesen charts that cover various SID, STAR, and layouts for each of the eight airports depicted in the scenery: Dusseldorf, Mönchengladbach, Bremen, Hamburg, Kiel, Lübeck, Erfurt and Berlin-Tegel.

The scenery claims full compatibility with Apollo's Europe 1 and Europe 1 Pro. When used with Europe 1, the graphics are



Busy Bremen: innovative transparent terminal windows



Erfurt Airport gates: excellent transparency effects and details

However, aircraft dynamic scenery reduces frame rates and there are other products that focus on this area, if that is what you are looking for.

Dynamic scenery populates all the airports and it is credible, as well as a lot of fun. For instance, if you block a bus' path, it will stop and wait for you to move. The vehicles run on real paths and all seem to be doing something useful.

Even with all this action going on, we did not experience any 3D "bleed-through" (background objects showing through foreground ones), although knowing the Flight Simulator 98 3D engine, we are sure there is bound to be the odd glitch.

Although containing only 8 airports, German Airports 3 is good value for money. If these airports are on your regular departure/destination list, you cannot go wrong. Even if the prospect of flying to Germany hasn't appealed to you, this package may entice you to Dusseldorf, Hamburg or Berlin-Tegel before you know it.

Alexander Lawrence

		Price: £24.99 Release Date: Out Now
Publisher: Aerosoft GmbH Developer: Thomas Hirsch, Peter Hiermeier Email: info@aerosoft.de Web: www.aerosoft.com Difficulty: Medium - High No of Players: 1	System Requirements: Minimum - Pentium 200 32MB RAM, 15 MB free hard disk space, DirectX 6.0 and higher. Installation: Windows 95/98 Advanced Graphics: DirectX 6.0 3D Graphics Accelerator (Min 4MB RAM). Control: joystick, throttle, rudder pedals, mouse, keyboard. Recommended - Pentium 300MHz or Higher, 32MB RAM or more, Graphics Cards	
Pros: Excellent graphics with undetectable 3D "bleed-through". Low frame-rate impact and good dynamic scenery. Plenty of printed charts. Cons: Bad English spelling. Only eight airports (but still good value for money)	Review PC: CPU: PentiumPro 200, 32MB RAM. Graphics: PCI 3D Blaster (Rendition V1000 based). Input: CH FlightStick. Sound Card: Sound Blaster AWE64. Monitor: 17" monitor	

Moving parts galore.



The Tornado sweeps back elegantly, and the landing gear on all aircraft retract as their designers intended

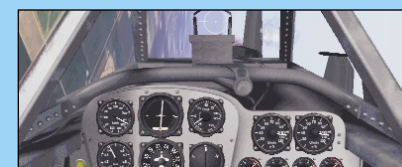
Achtung Baby!

Following on from the eminently successful RAF Collection, The Associates bring us the German equivalent, designed by FlightSim Developers. Spanning practically the entire age of powered flight, this bountiful package has twenty unique aircraft types to master in Microsoft Flight Simulator 98 (MSFS98) and Microsoft Combat Flight Simulator (CFS).

As with all new titles from The Associates, the box includes an informative manual together with a straightforward installation routine. A couple of minor annoyances are that you must install the CD twice if you want to use it for both MSFS98 and CFS, and there is no utility to allow individual aircraft to be selected. It's all or nothing, which adds up to 300+ megabytes for both installations.

Not that you'll want to miss anything in this wonderful assembly of flying machines. Starting in 1915 there is the Fokker E.I monoplane, the first aircraft to have a forward-firing machine gun whose bullets dodged the propeller. The Albatros D.V. and the Red Baron's unmistakable Dreidecker

AVIATION HISTORY — GERMAN STYLE



From WW1 to the new millennium, Luftwaffe Collection has it all

Luftwaffe Collection



Literally slice through the air in the F-104 Starfighter

a Matrox G200 too. The cockpit detailing on these fighters is truly obsessive, down to fully working Multi-Function Displays, autopilot systems and ground proximity indicators. Handling is silky smooth with the Typhoon and Tornado, while the older F-104 and Republic RF-84 require considerably greater attention. Dog fighting with guns in CFS is fun, but these aircraft are all great for sightseeing in MSFS98 too, given their superior handling and speed.



Superbly detailed cockpits, including HUDs and fully-functioning MFDs

An odd inclusion in Luftwaffe Collection is the Zeppelin airship. This is rather strange to fly, but fun, and has a ship-like 'cockpit' to it. As with some of the other WW2 aircraft, these may be better as targets for mission designers rather than for PC pilots just wanting to jump into Quick Combat for a blast. Nonetheless, there is such variety in this pack to offer enough for everyone, with an overall attention to detail that is outstanding.

Kenji Takeda

ALSO CONSIDER

Software Title: Pacific Theatre
Publisher: Abacus
Web site: www.abacuspub.com
Price: £34.99
PC Pilots rating: 3 out of 5

Software Title: RAF Collection
Publisher: The Associates
Web site: www.flightsim.co.uk
Price: £24.99
PC Pilots rating: 3 out of 5



The monstrous CH53 - yes, it's a devil to fly make up the Great War trio. All of these aircraft have lovely low-speed characteristics and a certain magical quality in their simplicity.

The seven Second World War aircraft include old favourites such as the Heinkel He 111, Junkers Ju 87 and Me-262, as well as obscurities like the Flettner FL 282 Kolibri helicopter and Blohm und Voss BV138 flying boat. These provide a wealth of opportunities to test your flying skills in all situations. The thrill of piloting the turbojet powered Me-262 in slash and run attacks on Allied bombers calls for precision flying. As does taking the James Bond-esque Flettner up for a ride without careering into the ground. The immensely detailed cockpits and authentic sounds enhance the mood substantially in all aircraft. The virtual cockpits work well in most aircraft too, overcoming some of the initial problems with other CFS add-ons.



The Red Baron takes on all comers, including WW2 veterans!

While taking the Messerschmitt up against B17s and B25s is satisfying, real fun can be had by putting more modern technology to the test. German variants of the Phantom, Tornado and Eurofighter are just some of the modern jets on offer. The level of detail on these is astounding, down to the engine intakes moving, wings sweeping back and wonderfully animated undercarriages.

The cockpits include include HUDs (Heads Up Displays) primarily designed for Voodoo cards only, but seeming to work perfectly on

		Price: £24.99 Release Date: Out Now
Publisher: The Associates Developer: FlightSim Developers (01480) 462748 Tel: www.flightsim.co.uk Web: www.flightsim.co.uk Difficulty: Easy No of Players: 1-8	System Requirements: Minimum - P266, 16MB RAM, DirectX-compatible SVGA video and soundcard Recommended - Pentium II 300, 64MB RAM, fast 3D accelerator card (Voodoo 1/2 or Riva TNT2)	
Pros: Oozing with authenticity, this pack offers wonderfully detailed aircraft from all eras, right up to the new Millennium. Plenty for everyone. Cons: A slightly eclectic combination of aircraft for use in Combat Flight Simulator. Aircraft aren't included as Quick Combat opponents. You must install separately for MSFS98 and CFS.	Review PC: 300MHz, 128MB RAM with 8MB Matrox G200.	
Frame Rates: Flight Simulator 98 at 1024x768, at Meigs airport. Figures in brackets are with default Cessna (for comparison) Very Sparse = 18 fps (50 fps) Normal = 15 fps (40 fps) Very Dense = 12 fps (30 fps)		

VIP Classic Airliners

Them were the days....

In this age of fly-by-wire, computer-controlled aircraft it is easy to forget the heritage of the wide-bodied airliner. The post-war era saw the demise of the turboprop as the first jet airliners began to appear. In an attempt to recapture this golden age, The VIP Group has put together the Classic Airliners collection, which features 13 unforgettable aircraft types, in a whole cavalcade of liveries. To help manage all of these permutations of aircraft, the idiot-proof install program allows the user to install (and change) a subset of those on offer - essential for those short on disk space.



The ubiquitous VC10 stretches out its wings and soars

In this fourth release from the talented VIP team, there is a tremendous amount of variety. The legendary DC-3/C-47 (the same one as in other VIP collections) is the oldest aircraft to feature, being of 1935-vintage. This classic plane is well presented here and as always, is a real joy to fly. The nice cockpit panel, external detailing and sounds all combine for an atmospheric experience. The panel of the DC-4 is based on the Berlin Airlift 'Spirit of Freedom' aircraft, and as can be seen from the screenshot and photo, it has been reproduced remarkably well.



One of the World's real workhorses, the 727 is a nippy little beast

Moving into the age of the turboprop, we are presented with the lovely Vickers Viscount in ten classic liveries. As with the other aircraft in this collection, seeing them in their true colour scertainly brings back happy memories of days gone by. Then there is the legendary De Havilland Comet, the world's first commercial jet airliner and subsequently the basis for the Nimrod Early Warning aircraft. Its rather complicated (but realistic) cockpit panel and heavy canopy structure serve to remind the pilot that this was indeed a pioneering



Gauges R' Us, back when cockpits weren't just filled with TV screens

aircraft. Another truly British aircraft is the VC10, still offering sterling service to the RAF, but woefully out of date in the commercial scene. This model conveys its sleek lines well, and the flight model is a reminder that computerised flight control systems haven't been around forever.

Other highlights include the Lockheed Electra, soon to be the star of a new multimedia CD-ROM set from the VIP Group. The model here is smooth to fly, and the warm engine sounds are music to the veteran pilot's ears. Boeings first trio of jet airliners are featured prominently too. The infamous 707 gleams in 25 liveries, belying its popularity worldwide as a first-class transport. The rather petite 727 is a fun little runabout to throw around, and is a real contrast the larger planes, such as the DC-8. The ubiquitous 737, in -200 configuration is a welcome replacement for the standard Microsoft aircraft and is a giant step up in realism.

There are some minor glitches of note though. For example, some of the panels feature beautifully shaded gauges that bring



The DC-4/C-54 is based on the Spirit of Freedom aircraft in Berlin. Can you spot the difference?



ALSO CONSIDER

Software Title: Legendary Aircraft Collection
Publisher: The Associates
Web site: www.flightsim.co.uk
Price: £19.99
PC Pilots rating: 3 out of 5

Software Title: Classic Wings 98
Publisher: The Associates
Web site: www.flightsim.co.uk
Price: £19.99
PC Pilots rating: 4 out of 5

them to life, while others stick to strictly 2D (default Microsoft) representations. Also, there is a bit of pixelation with some of the paint schemes, some faceting of engine cowlings and a lack of animated moving parts. However, the overall quality of the aircraft here is world-class, and there is definitely no problem identifying the characteristic silhouettes of these airborne legends. VIP Airliner Collection will undoubtedly satisfy aviation enthusiasts harking back to 'the good old days'.

Kenji Takeda

Publisher: The Associates
Developer: The VIP Group
Tel: (01480) 462748
Web: Web: www.flightsim.co.uk
Difficulty: Easy
No of Players: 1-8

Pros: Retro planes from one of the golden eras of flight. Several superb panels, and an enticing collection of airliners to enjoy.
Cons: While overall panel quality is good, there are only some that truly excel. A lack of animated parts and some pixelated textures diminish the overall photo-realism.

Frame Rates:
 Frame rates with Flight Simulator 98 taken over Meigs in BAC-111 cockpit view at 1024x768 resolution.
Very Sparse = 3D 63 **Normal** = 3D 46 **Very Dense** = 3D 33

Price: £24.99
Release Date: Out Now

System Requirements:
Minimum - Pentium 166, 16MB RAM
Advanced Graphics: D3D video and soundcard.
Control: joystick, throttle, rudder pedals, mouse, keyboard.
Recommended - Pentium II 300, 64MB RAM, 3D accelerator card (Voodoo II or Riva TNT)
Review PC: Celeron 300MHz, 128MB, 8MB Matrox G200 AGP and 4MB Maxi Gamer 32 3Dfx Voodoo video cards.

Chasing the Sun

Concorde is a name the whole world recognises. With the launch of Flight Simulator 2000 just around the corner, the life and times of a Concorde pilot are a topical subject.

Mike Bannister is flight manager for BA at its Heathrow airport headquarters and has over 30 years flying experience. He is regarded as a 'top gun' of commercial pilots.

"I'm one of these lucky folks that since the age of seven knew what I wanted to do.

When I was a child, every summer holiday, my family went down to Bournemouth, Poole and Hengisbury Head. We lived in Luton and it used to take five and a

half hours to get there. I used to sit on the beach at Boscombe and watch little aeroplanes flying to France. I worked out if that I was in one of those aeroplanes, the wretched five and a half hour journey from Luton would only take about 20 minutes. So, I thought: 'That's what I want to do, I want to be a pilot'.

I have been interested in PC-based flight simulation since the early days...

I went to the College of Air Training at Hamble which at the time was rather like a "University of the Air". I attended a three-year University type course compressed into a period of about 18 months with very little vacation time. I graduated in 1969."

While there, Bannister saw the first flight of the British-assembled Concorde from Bristol to Fairford. He remembered thinking: "I like the look of that. That's what I would like to do." He joined BOAC on the VC10 as a pilot and navigator and in 1977 took a six month conversion course to go on Concorde. He went on to become the

Mike Clark, chats with Mike Bannister, Concorde pilot for British Airways...

captain who ran the training on the 1-11 fleet, then to technical management and onto 757s and 767s. Finally in 1995 Bannister became Flight Manager for British Airways, effectively the chief Concorde pilot.

"I remember my very first Concorde flight. It was when I was a co-pilot. It was in August 1977 when we took off from Brize Norton where we did our training. I can remember doing as if it were yesterday. The unbelievable awe that I felt when I was allowed to unleash this power and endeavour to control it. I can still remember the training Captain turning to me and smiling because I was grinning so much.



"It was a highlight to come back to Concorde as a Captain. It was a highlight to be on the job as flight manager. I have flown some very interesting people, been to some fascinating places and done some unusual things"

Mike then mentioned how Concorde had recently chased the total eclipse of the sun and flew with the Red Arrows display team for the 50th anniversary of Heathrow and the state opening of the Scottish Parliament...

"One of the lovely things about the job is that there is no typical day. Lets take a day flying the aeroplane on a standard route like London to New York. We have two flights a day, one at 10:30am and the other at 7pm."

"For the evening flight, I arrive at the office around mid-afternoon and try and get in some office work before flying. About an hour and forty minutes before we are due off, I will meet up with the other two members of the crew - the co-pilot and flight engineer - and we go off for a briefing. We look at all the weather en route and operational considerations including any decisions about how much

fuel we are going to carry, any special conditions that prevail and any special people that might be on board. Then we go and meet up with the other six members of the crew and go out to the aeroplane, which is parked over at Terminal 4."

"We board the aircraft and then start the pre-flight processes and checks that take about an hour. Then the passengers join us around 20 minutes before we are ready to leave."

"We finalise the paperwork and about five minutes before we go, we start up two of our Rolls-Royce engines, then push the aircraft back into the parking area and start the other two engines. We don't get any priority at any airport in the world, so we join the pattern and typically get airborne from Heathrow between 7.10 and 7.15pm."

"By now we are climbing out and flying subsonically over the West Country. Because the aircraft's wing is designed to generate lift in a different way to a conventional wing, the minimum drag speed for Concorde is very fast. The faster you go, the better the performance. So once you are able to get the aeroplane up to high speed then you can climb at a maximum weight of between 4,000 and 6,000 ft per minute. At slower speed the performance of Concorde is not so good so we want to get her moving quickly and as fast as possible. We want to get her to her normal climb out speed of around 400 Knots as soon as we can."



Mike Bannister



Inside the Concorde Cockpit Simulator

"We accelerate to Mach 0.95 or 95% of the speed of sound, which is 100 mph faster than a conventional aeroplane. We fly like that until we get over the Bristol Channel and south of Swansea. At this point we can start our acceleration to supersonic speed and to do that we switch on the re-heat again, which we use for takeoff. These are used to push us through the sound barrier that is a physical aerodynamic barrier. There is no sensation whatsoever of going through the sound barrier. The only indication you get is a slight flickering of the vertical speed indicator as the shock wave passes the static plates.

I'm one of these lucky folks that since the age of seven knew what I wanted to do.

"Now we continue climbing and accelerating until we reach Mach 1.7 and at that stage the engines become so efficient that we can switch the re-heats off and the aeroplane will still climb and accelerate with just full power. There is no other aircraft that can do that.

"Then we cruise at Mach 2 from 50,000 ft gradually climbing, as the aircraft gets lighter. We are travelling then at about 1,350 mph, which is faster than the relative speed of the sun. What happens as you roar across the Atlantic faster than the speed of sound is that the sun rises in the west. You see this unusual sight of a westerly sunrise and the sun comes up above you as you as you go across the Atlantic. By the time you have flown at Mach 2 for over two hours the sun is quite high in the sky.

"When we are about 250 miles away from New York, we start slowing down and join the traffic patterns. We land at New York using special procedures designed to minimise the environmental impact. Then we taxi in and

park at the BA terminal on schedule at 5:50pm. So, with the time difference, we have gained an hour and ten minutes.

"I am also fortunate enough to be BA test pilot for Concorde and we do at least one of these tests a year outside the normal flight envelope. We take her up to 63,000 ft as opposed to 60,000ft and faster than Mach 2. We slower down at 60,000ft to a mere 250 knots and stall her and deliberately shut engines down. All part of the standard flight test parameters for the Civil Aviation Authority's Certificate Of Airworthiness Test.

"On average we fly each Concorde three hours a day. Comparing that to a 747 flying 13 hours a day. So, she's done far fewer flying hours than her years imply. She's about four years old and that's what really matters, the condition of the aeroplane."



Concorde being prepared for it's long haul.

"The last time we took a Concorde completely to pieces we found her in superb condition inside. So she's not just equivalent to being four years old, she's also in very great shape. We envisage keeping Concorde in service well into the next century."

Bannister is a big fan of flight simulation . . .

Bannister is a big fan of flight simulation and has been intrigued to monitor its progress since the early days when it was nothing like it is now.

"I have been interested in PC-based flight simulation since the early days and been fascinated by how it's progressed from the very early stages of simple design through to the modern PC simulations. With the advent of Force Feedback Sticks and wheels it has become even more enjoyable. I would like to upgrade even further and have multiple monitors and wrap those around me but as my wife quite rightly says: 'Darling, if you really want to do that then pop down to Bristol and fly the Concorde one'. So I do!"

"There's no doubt about it that the sophisticated, learning-based PC simulators have been a great boon. Even the ones that are designed as training aids can be "entertaining". Certainly we have seen that from the people that have come to BA as pilots, having had that experience early, they have benefited from it.

"One of the things we always look for in somebody who wants to be a pilot with BA is evidence of enthusiasm, commitment and dedication. It is an expensive exercise to learn how to fly. What we don't want to do is rule out opportunities to those who aren't fortunate enough to learn to fly with a flying club. So, if somebody has bought an inexpensive PC and learned the basics then they are demonstrating an enthusiasm that we want to see built upon.

Facts about Concorde

Concorde is the world's first supersonic airliner. The prototype first flew in December 1967 and Concorde went into service on January 21, 1976. The British Aircraft Corporation (BAC) in Bristol built the second prototype in 1969. Only 20 Concorde were ever built.

Concorde has four Rolls Royce/SNEMCA Olympus 593 engines that are equipped with afterburners. These afterburners account for 25% of the Concorde's thrust (28,000 lbs).

The aircraft accelerates from 0 to 225 mph in 30 seconds and lifts off at 250 mph.

The Concorde does not use conventional ailerons and elevators like subsonic aircraft today. Instead, the Concorde has a combination of ailerons and elevators called "elevons" that allow the aircraft to be controlled while travelling through the air.

Concorde can fly at altitudes of up to 60,000 ft, as opposed to the Boeing 767, which was designed to fly at 41,000 or 43,000 ft (when conditions prevail). At that height you are above 90% of the earth's atmosphere.

The fuel set-up in Concorde is unique. She has three different types of fuel systems. Feed tanks, collector tanks and trim tanks all work together to maintain maximum stability by matching the centre of gravity V centre of lift which is very hard to overcome.

Due to heat circulation in the cabin, the fuselage of Concorde expands up to 10 inches.

Due to the extraordinary speed Concorde travels at, air friction causes the fuselage to heat up. The temperature of the nose cone can rise by up to 127 degrees Celsius. Because of this the paint has to be heat sensitive. This paint deflects the heat thus preventing the aircraft from setting on fire. A similar type of paint can also be found on the NASA Space Shuttle and on military aircraft like the Stealth Bomber.

Even the windows on Concorde are unique. They are different because they have to cope with varying air pressures that are found from sea level to 60,000 feet.

There are now only two airlines in the World that use Concorde in their fleet. These airlines are BA and Air France. Singapore Airlines have also been known to lease a Concorde from time to time.

So, taking all this information into account, what would it mean if you ever flew on Concorde? Well, take a look at this example...

Paris to New York on a 747-200 takes 8 hours, 5 minutes

Paris to New York on Concorde takes 3 hours 45 minutes



Concorde on it's way to Heathrow's runway 27L

"BA was approached by Microsoft last year to see if we would be interested in working with them to develop a PC-based Concorde Simulator. With Microsoft's pedigree in the PC Simulator market we were certainly interested in working with the market leader.

"Any PC Based flight simulator that modelled Concorde had to be as accurate as possible and it needs to be entertaining as well. So it's a question of striking the right balance.

"BA policy for flight crews is that we retire at 55. I'm 50 right now so that gives me five years in the best job in the world. I have some ideas about what I will do when I retire, so the next five years are going to be interesting. What's beyond that is still an open question, but it will certainly involve aviation in some form - even if it's flying small aeroplanes again."

Mike Clark

SPECIFICATIONS

Total in service today:	British Airways: seven Air France: five
Capacity:	100 passengers
Cargo Capacity:	1,300 lbs (0.59 tonnes)
Seating:	100 x 2:2, with a 37 ins (94 cm) pitch
Range:	3,740 miles (5,943 kms)
Engines:	4x Rolls-Royce/SNECMA Olympus 593s, each producing 38,000 lbs
Engines:	Aux3DRheat
Take-off speed:	250 mph (402 kph)
Cruising speed:	1,336 mph (2,150 kph/Mach 2),
Landing speed:	187 mph (300 kph)
Ceiling:	55,000 ft (16,765 m)
Autoland capability:	Category 3 (DH, 15 ft; landing RVR, 200 m; take-off RVR, 150m)
Length:	203 ft 9 ins (62.1 m)
Wingspan:	83 ft 8 ins (25.5 m)
Height:	37 ft 1 ins (11.3 m)
Fuselage width:	9 ft 6 ins (2.9 m)
Fuel capacity:	26,286 Imperial gallons (119,500 litres/95,600 kgs)
Fuel consumption:	5,638 Imperial gallons (25,629 litres/20,500 kgs) per hour
Maximum take-off weight:	408,000 lbs (185 tonnes)
Landing gear:	Eight main wheels (tyres 232 lbs sq in), two nose wheels (tyres 191 lbs/sq in)
Flight crew:	Two pilots, one flight engineer
Cabin crew:	Six
Introduced:	1976
Average age of aircraft:	21.3 years



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BEFORE USING THESE TUTORIALS

Know How Your Sim Operates.

How you operate your flight simulator program is up to you. Some flight simmers use simple joysticks. Others use advanced twist-grip sticks. Some rely entirely on the keyboard. A few flight simmers actually use yokes and rudder pedals. Our instruction assumes that you know how to operate your flight simulator program and you are familiar with its controls. If you are not, then do so now and return to your flight lesson when you are ready.

Fly One Step At A Time.

We hear from many flight simmers that want to skip over the basics and challenge themselves with heavy aircraft and instrument flight right off. While this is a great luxury of flight simulation, it deprives them of the skills they need for meeting advanced challenges. When encountering situations for which they are unprepared, flight simmers frustrate themselves with poor performance such as sloppy landings and even crashes. We strongly advise doing everything one step at a time and building your skills toward the next levels. That is one of the reasons why these lessons start at the basics!

Use These Tutorials For Flight Simulation Only!

These tutorials are intended for flight simulation. No matter how much the programmers try to make their aircraft, panels and sceneries realistic, there are certain limitations to the program that cannot be overcome. As examples, the outside views are computerised depictions through windows that are about the size of a typical business-letter envelope. There are no truly peripheral views, and the only way to see left or right is to manually change views, which is considerably more awkward than simply turning your head. The aircraft performances are not fully realistic in every detail. The joystick, mouse and keyboard operations are not realistic - real-world general-aviation pilots don't use them to control their real-world aircraft. While we have made every effort to make our tutorials as realistic as feasible, we have adapted them out of necessity to the limits and nuances of flight simulation, so some aspects cannot and do not apply to real-world flight. Therefore, we caution everyone to use these tutorials for their intended purposes, and we accept no liability for anybody's misuse of them.

PLEASE NOTE: We have created this series to be applicable to a variety of simulators - Microsoft Flight Simulator, Fly!, Flight Unlimited, etc. However, the instruction has been based on Microsoft Flight Simulator as this is by far the most popular simulation in use. If you do not find the instructions or features in your favoured sim, we apologise, but hope you will be able to adapt the tutorial as required.

Flight Sim Training

Professional instruction with Bill Stack

VFR (Visual Flight Rules) Tutorial

Part 1

Airport Traffic Pattern... Nearly Everything in a Single Procedure

In this first tutorial, we will guide you through an airport traffic pattern for your first exposure to the realistic simulation of real-world flight. You will take off, circle around and land again on the same runway. This pattern enables you to execute most of the manoeuvres that real-world pilots use every day: take off, climb, turn, fly straight and level, descend, approach and land. In future tutorials, we will explain each of these manoeuvres in more detail.

Are you ready to take off?

Throttling up and taking off as soon as you see your aircraft sitting on the runway is not realistic. Just because your aircraft is sitting on the runway in a take-off position does not mean you are ready to take off! It is simply a luxury of flight simulation. If you have not set your radio frequencies, run up your engine and received ATC (air traffic control) clearance, you are not realistically ready to go anywhere.

Select Your Aircraft and Airport.

We will fly a Cessna 172 or 182 with fixed landing gear at London City airport. This Cessna is a good trainer because it is easy to fly and requires the least work of the general default aircraft. Having fixed landing gear eliminates two steps - raising and lowering. If your sim does not have this aircraft, select a comparable single-engine, fixed-gear general-aviation replacement. For future tutorials we will graduate to an aircraft

with retractable gear. London City is a convenient single-runway facility in central London, positioned on the River Thames. Its 3,900-foot (1,190-meter) runway is ample for our aircraft. The London scenery is more detailed than most default sceneries and it provides useful landmarks for visual navigation. We will use runway 28 for taking off and landing. Set your weather for zero wind and cloudless skies. We will fly in splendid weather today and reserve challenging weather for later.

Prepare Your Aircraft and Cockpit.

Your aircraft and cockpit must be ready for our flight when you begin take off. This means your engine must be running and communication and navigation radios should be set to the frequencies you will use. Additionally, you should clear your flight simming area of books, papers, cups and other items that could get in your way during our flight. Set your communication radio to 127.95 for London City Airport's Automatic Terminal Information Service (ATIS). We will not need to set frequencies for radio navigation aids (navaids) today because we are executing a simple airport traffic pattern. Flaps will not be needed for these flights, so be sure they are in the zero (fully up) position.

Get ATC Clearance.

For space considerations in this tutorial, we will imagine that we have filed a flight plan with air traffic control, requested and received all the appropriate

clearances, and gone through our run-up. In future tutorials, we will cover these procedures.

Commence Take-Off.

Advance your throttle swiftly and smoothly to maximum. As your aircraft begins rolling down the runway, keep it on the runway's centreline. Move it gently to the left or right using the rudder as necessary to keep it centered. As your speed increases, less and less pressure on the controls is needed to keep steady - even a slight excess can steer you off a narrow runway.

Lift Off.

Watch your airspeed on the airspeed indicator (ASI). Lift off when your airspeed reaches about 60 knots. (A knot is one nautical mile per hour, and a nautical mile is 6,076 feet, 1.15 statute miles or 1.852 kilometres). The aircraft should start lifting off the runway by itself when lift is sufficient, but you might need to help it a little by applying continuous back pressure to the elevators. If you help your aircraft lift off the ground with your elevators, be sure to do it gently so you will not climb too steeply, which can cause your aircraft to stall and crash.

Climb Out.

As your aircraft continues rising above the runway it will enter a phase called positive climb. In this phase, your aircraft is definitely gaining altitude and has no risk of falling back onto the runway. Although the aircraft will gain airspeed rapidly after losing contact with the ground, a little back pressure on the elevators might be needed to maintain the attitude needed to ensure the climb. Climb out is officially defined as the phase between lift off and cruise altitude, but it is usually thought of as that phase when an aircraft gains altitude quickly after lifting off and enters its normal flight.



Climb out at about 80 knots.



View of London City Airport from crosswind leg.

Climb at about 80 knots on your airspeed indicator and about 500 feet per minute on your vertical speed indicator (VSI). At this climb rate, reaching our pattern altitude of 1,000 feet (305 meters) above mean sea level (MSL) will take about two minutes.

Pause any time you need to. Without a flight instructor beside you for assistance, pausing is the only way to check your tutorial and be sure you are following correctly.

Level Off.

When you reach 1,000 feet above mean sea level (MSL), level off and begin straight and level flight. This manoeuvre requires reducing your aircraft's power and holding the nose steady on the horizon. Airport traffic patterns are flown at a constant altitude between 600 and 1,500 feet (183 to 458 meters) above ground level (AGL). Because this airport's elevation is 17 feet MSL, our pattern altitude will be well within guidelines and will provide ample space for our manoeuvres. Reduce the throttle to about 2,100 revolutions per minute (RPM) on the tachometer, and adjust the elevator trim until your altitude is steady at 1,000 feet MSL. You must hold this altitude for about half the traffic pattern.

The exact engine power settings might differ for each aircraft type and simulation program, so adjust your throttle as necessary to achieve the desired airspeed and note the engine RPM associated with that airspeed for your aircraft and simulator.

Enter the Traffic Pattern.

An airport traffic pattern comprises a series of 90-degree left turns and straight legs that

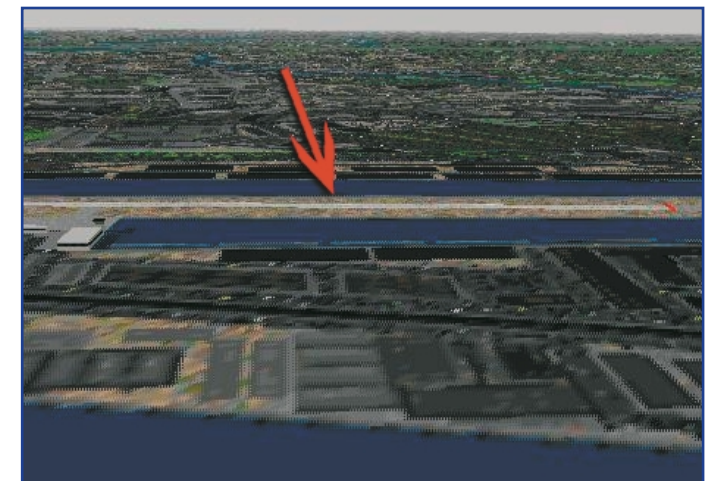
looking at a real airport runway through the window of a real airplane with a live instructor beside them in real time. We are adapting our guidance to flight simulation, because our pilots are looking at computerised depictions, and they don't have live instructors with them during their flights. This is one reason that these tutorials are for flight-simulation games and not for real-world flight.

Enter the Downwind Leg.

After 15 seconds on this leg, turn left 90 degrees at a 20-degree bank and enter the downwind leg. This leg is parallel to the runway from which you just took off, and you will be flying in the opposite direction. Be sure that your heading is exactly opposite the heading you used when you took off. At this airport, your take-off heading was 277, so you should be heading 097 on the downwind leg. You also should see the River Thames out of your left window. Look for the airport and the runway just north of the river. As you pass the opposite end of the runway, check your clock and write down the time again. Flying 30 seconds past the end of the runway at 110 knots will bring you one nautical mile from the airport, which will allow you plenty of room for aligning the runway for your landing once you get on the final approach. Request landing clearance from ATC during this portion of the downwind leg.

Enter the Base Leg.

You are now about to execute the two most challenging portions of your pattern. During your base leg and the final approach, you will repeatedly



View of London City Airport from downwind leg of runway 28.

look outside for visual cues and at your panel for altitude, airspeed and descent information. You will be kept busy, and you will have no time for sightseeing until you are firmly on the ground. Your base leg will last about as long as your crosswind leg, and your final approach will last a little longer but seem to flash by.

We are going to take you further from the runway than typical for your base leg so you will have plenty of room for turning, aligning the runway, and correcting errors you might make. Later, when you feel more comfortable with this procedure, you can start your base leg as close as one-quarter mile from the runway (according to the books).

When you reach 30 seconds past the runway, you will be about one mile from it. Turn left 90 degrees at a 20-degree bank into the base leg. When you straighten out of the turn, you should be heading 007. Reduce your airspeed to about 80 knots by reducing engine power to about 1800 RPM, and begin a gradual descent at between 400 and 500 feet per minute.

When you feel more comfortable with this procedure, especially your approaches, use this simple technique: turn from the downwind leg to the base leg when the runway appears in the middle of your left-rear view.

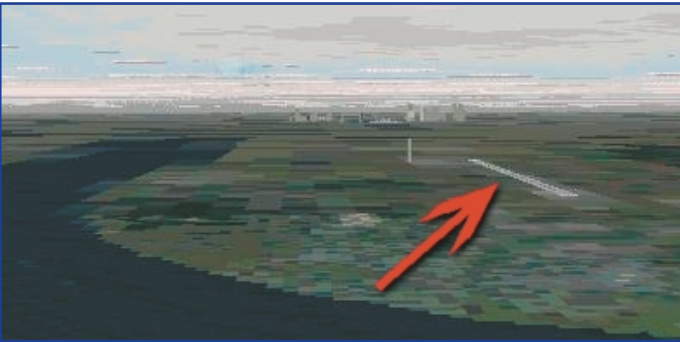
Enter the Final Approach.

Knowing when to turn left into your final approach is a visual decision that requires experience. Here's a good tip: when the runway is in the middle of the right half of your left window frame, begin a smooth 90-degree left turn at a 20-degree bank into the final approach. Reduce your airspeed to about 70 knots. Descend slowly during your turn by reducing your power slightly.

IFR (Instrument Flight Rules) Tutorial

Part 1
Completing a Precision Instrument Approach

In our first instrument flight tutorial, we will take you on a precision instrument approach to an airport. Precision instrument approaches use an instrument landing system (ILS), and the airport we will use for our

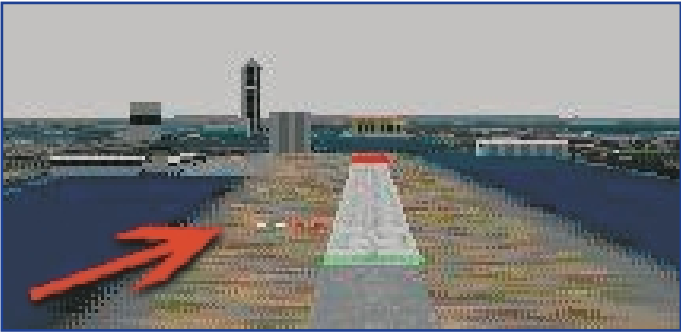


View of London City Airport runway 28 from the base leg.

Align your aircraft with the runway centreline during your final approach. Remember that we've taken you further out than usual so you will have plenty of space and time for aligning the runway and correcting errors. Don't feel bad if several adjustments are needed. Doing this procedure smoothly requires practice.

Descend gradually at about 70 knots on your ASI and about 400 to 500 feet per minute on the vertical speed indicator (VSI). This airspeed and descent rate will enable a steady controllable descent toward the runway. Reduce power as much as necessary to maintain this airspeed and descent rate, but don't reduce power so much that you could lose control. About 1500 RPM should be about right.

Watch the visual approach slope indicators (VASi) to the left of the runway. They are red and white lights that indicate whether you are high, low or just right on your approach slope. If they are all white, you are high. If they are all red, you are low. If half are white and half are red, you are just right. Use your throttle to control your decent rate - more power raises you and less power lowers you. Use your elevators to control your airspeed - pull up to reduce and push down to increase. Do all these things gently, never



Final approach to runway 28 at London City Airport.

abruptly. Be careful about pulling the nose up to gain altitude if you are too low, because you could cause a stall.

Pause any time you need to during this manoeuvre. Landing properly requires plenty of practice, and you might need several attempts to get it right. In a future tutorial considerable attention will be devoted to this manoeuvre.

Land.

When your aircraft is just above the runway, ground features such as runway markings will be coming at you very fast, the runway width will nearly consume the bottom of your windscreen and the ground details will be about as large as they get. Reduce power to zero and level off by pulling up sufficiently on your elevators. Don't pull up too much, or you will start rising again. This

procedure is called a flare, and it will cause your aircraft to gently settle onto the runway. Don't worry if your aircraft floats above the runway for a few seconds. Floating results from ground effect, and it is greater with faster landing speeds in a given aircraft. This runway is plenty long enough for a safe landing. Be sure your throttle is fully down, and your aircraft will settle on the runway by itself.

Upon landing, you have two choices: (1) You can execute a touch and go, or (2) you can exit the runway and end your tutorial. If you choose a touch and go, maximize power immediately upon touching down, take off again and repeat this entire procedure. If you choose to end your tutorial, allow your aircraft to decelerate to about 30 knots, then apply enough power to proceed to the next turnoff and exit the runway.

Congratulations! You have just executed a fundamental flight procedure that uses almost all the essential flight manoeuvres. This was a great exposure to the sort of flying that real-world pilots do - with some adaptation for the limits of flight simulation. Fly it again and again to build your skills. In future tutorials, we will explain each of this pattern's manoeuvres in more detail. ■

Flying on instruments requires proficiency with basic flight manoeuvres. If you are able to fly straight and level, turn, climb and descend, and if you can read and follow aircraft and navigation instruments, then you are ready for instrument flight. However, if you are not able to perform these tasks, you should build those skills before attempting instrument flight. In real world flying, attempting instrument flight without these skills invites

disaster. In flight simulation, it invites frustration and self-defeat. For these reasons, our instrument tutorials presume knowledge of basic flight manoeuvres and all cockpit instruments.

Some of the guidance in the VFR tutorial applies to this tutorial, as well. Selecting your aircraft and airport, preparing your cockpit and running up your engine are fundamentals that apply to every simulated flight.

Select Your Aircraft and Airport.

You will fly a Cessna 172 or 182 with retractable landing gear at the London City airport in central London. Its identifier code is EGLC. This Cessna is a good trainer because of its easy flight characteristics and relatively low workload. If your program does not have this aircraft, select a comparable single-engine, retractable-gear general-aviation aircraft. London City is an ideal single runway. Its 3,900-foot (1,190-meter) runway is ample for the aircraft and its instrument landing systems on both ends of the runway enable easy and precise instrument landings.

We will take off and land using runway 28.

According to the published instrument approach procedures, aircraft approaching London City airport on instruments are normally radar vectored. This means that ATC guides pilots verbally through the approach procedure. You will not have such assistance, so we will navigate this procedure ourselves as closely as we can without the benefit of ATC. Accordingly, you will fly around and return to the airport with almost total reliance on your radio navigation skills from just after taking off until your final approach.

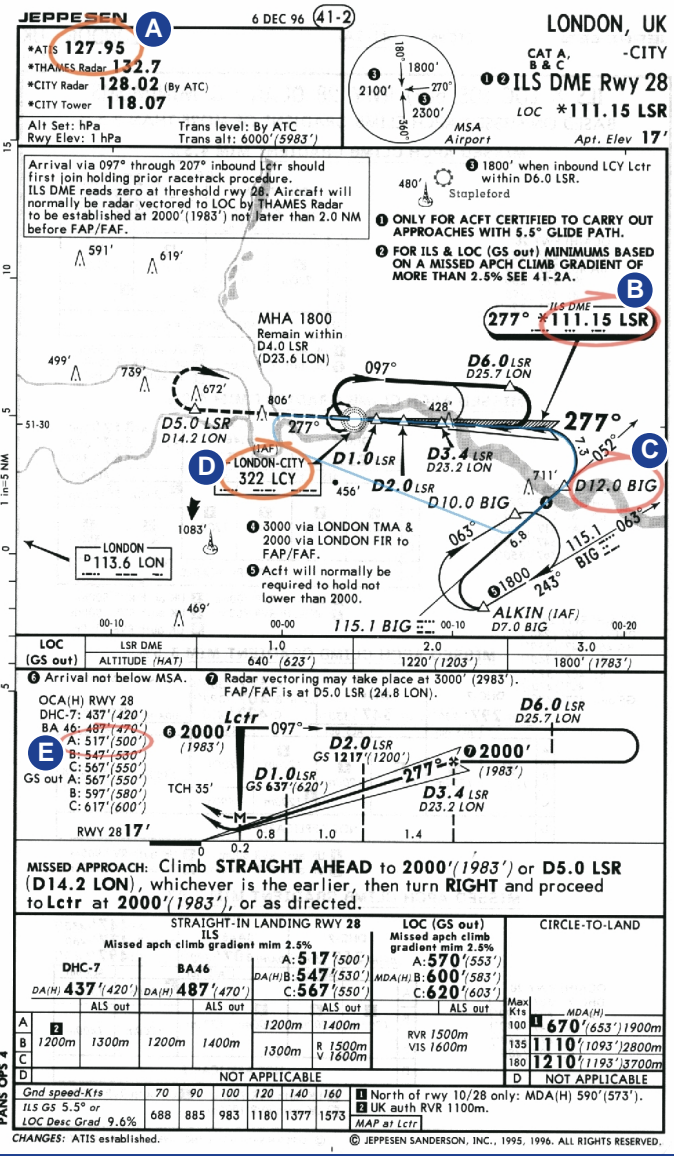
Set Your Weather.

Because we are flying IFR, we must have instrument meteorological conditions (IMC). Set an overcast ceiling of 750 feet (229 meters) and a top of 5,000 feet (1,525 meters). This cloud cover will block all your visual references during most of your flight. Set the winds at zero, so you will not need to compensate for them. We will fly with winds later.

Alternatively, try this instrument approach procedure in clear weather so you can see and grasp what is happening throughout.

Prepare Your Aircraft and Cockpit.

Be sure your aircraft and cockpit are ready for your flight when you take off. Set your communication radio to 127.95 for London City airport's Automatic Terminal Information Service (ATIS). We will use the ILS on runway 28, which is



Please note: these charts are NOT to be used for real navigational purposes. They are for information ONLY.
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KEY

- A This is the ATIS frequency for the airport
- B This is the ILS frequency for runway 28 (277°)
- C VOR 'BIG', the frequency 115.1 is shown just below.
- D London City's NDB, 322 LCY
- E The 'Decision Height' is shown here. 517' for a Class A aircraft.

called "LSR", and a nearby VOR called "BIG." Set your navigation 1 radio 111.15 for LSR and the alternate nav 1 frequency to 115.1 for BIG, and your ADF to 322 for the NDB named "LCY." Look for these nav aids on the chart so you will know where they are. Flaps will not be needed, so be sure they are in the zero (fully up) position. Turn on your navigation lights.

Run Up Your Engine.

For the sake of simplicity and consideration of space, we will assume that we have filed a flight plan with ATC, requested and received the appropriate clearances, and performed our run up. In future tutorials, we will actually do these procedures.

Take-Off and Climb Out.

When you are ready, proceed with your take-off. Climb out at about 80 knots and about 500 feet per minute. Level off when you reach 2,000 feet (610 meters) MSL. This is the prescribed altitude for instrument approaches at this airport, because it keeps aircraft well above the many buildings and towers in the area, none of which you can see when you're flying inside clouds. With your ceiling set at 750 feet, you will be well inside the clouds when you reach the desired altitude. At this climb rate, you will get there in about four minutes.

Pause any time you need to.

It is the only way to check your tutorial and be sure you are following along when you don't have an instructor sitting beside you.

Head Toward the Fix.

We will join the approach procedure at a fix labelled D12.0 BIG southeast of the airport. The actual initial approach fix for this procedure is ALKIN, which is farther to the south. It's too far away and will take too much time for our tutorial, so we "received" ATC clearance for bypassing it and joining the procedure at the second fix for training purposes only. Our procedure is similar to the radar vectors ATC would give a real-world pilot in this training situation. Otherwise,

we would normally enter the procedure at ALKIN.

Once you reach your 2000 MSL altitude, execute a standard-rate 160-degree left turn for a heading of 117. A standard-rate turn is one that covers three degrees of arc per second. When the airplane symbol in your turn coordinator is aligned with the L, your turn is standard rate. This turn will last 50 to 55 seconds. Upon exiting this turn, be sure your heading is 117, which will lead you to a point along the instrument approach path shown on the chart.

At 110 knots, this portion of your flight will last about five and one-half minutes. Throughout this period, be sure to maintain your 2000 MSL altitude, your 117 heading and your 110-knot airspeed. Without ground references or ATC radar vectoring, you must make sure your altitude, headings and turns are precise. As you pass the locator (NDB) LCY, contact ATC and request landing clearance. You will know you are passing it when the ADF needle sweeps from forward to aft.

Intercept the Radial.

Our fix, D12.0 BIG, is 12.0 miles from BIG on this VOR's 052 radial. To get there, we need to intercept the 052 radial then fly along it until we reach the fix. When you reach the 052 radial, turn left 65 degrees and head 052 toward the fix. This turn will last about 45 seconds, and you will follow this radial for about one and one-half minutes.

Enter the Final Approach.

When you reach 12.0 miles from BIG along its 052 radial, you are at this fix. Turn left 135 degrees



Both OBI needles are centered when the aircraft is aligned with the localizer and the glide slope.

at a standard rate into the final approach path. This turn will last about 45 seconds. Switch your nav radio to LSR during this turn.

Intercept the Localizer.

Upon exiting this turn, you should be headed 277 and be aligned with the LSR localizer. The vertical needle centered in the OBI will show this alignment. Adjust your heading as necessary if you are not aligned. Move toward the right if the needle is to the right and vice versa. The further the needle is from the centre, the more you will need to move, obviously, but do all these manoeuvres gently. You are about six miles from the runway, so you have plenty of room and time for aligning the localizer.

Intercept the Glide Slope.

Continue along the localizer and at your 2000 MSL altitude until you intercept the glide slope. The horizontal needle being centered in the OBI will show this interception. According to the profile view on the chart, this interception should take place when we are 3.4 miles from LSR, which is plenty of distance for an accurate and safe approach.

Once you have intercepted the glide slope, reduce your power to begin your descent, follow the glide slope and localizer to the next fix. Reduce or increase power as necessary to maintain your descent along the glide slope, and nudge left or right to maintain your path along the localizer.

The chart shows that when you are 2.0 miles from the runway, your altitude should be 1217 MSL. If you are on the glide slope, shown by the horizontal needle being centered, this should not be a problem. If you are not at this altitude at this distance from the runway, you need to correct your altitude immediately.

Decide Whether to Land or Try Again.

Your next fix is the decision point. Here, you will decide whether to continue with your landing or abort it and execute a missed approach. The list in the left end of the profile view



Use your OBI heading and your DME to determine when you reach fixes in the procedure.



on the chart shows our decision point at an altitude of 517 MSL along the glide slope (our light aircraft is class A, and the glide slope is working). When you reach this altitude, you should see the runway ahead of you. If so, you can continue with your landing. If not, you must abort your landing and execute a missed approach.

Avoid any temptation to force your landing from an improper position. It can result in a flawed landing or a crash.

Executing a Missed Approach.

If you need to abort your landing, execute a missed approach immediately as follows: throttle up to full power, climb to 2,000 feet, notify ATC, fly to a fix west of the airport (D5.0 LSR and D14.2 LON), and repeat this procedure from that point. Normally, ATC would hold you at a fix and instruct you what to do next, but for the sake of simplicity and the consideration of space, we will imagine that ATC will clear you for another approach right away.

Land.

If you do not need to execute a missed approach, proceed with your landing as usual. Exit the runway or take off again and repeat this tutorial, whichever you choose.

Congratulations!

You have just executed a precision instrument approach procedure. You can see why

proficiency in basic flight techniques is requisite for instrument flying. Without it, you probably would be unable to perform this elementary instrument approach procedure. Practice this short flight as many times as needed to build your precision approach skills. In future tutorials, we will explain various non-precision approaches.

Bill Stack
Tutorials for PC Pilot

Nels Anderson (Pilot)
Technical Consultant

PC Pilot's Tutorials are officially approved by Training Associates.

Bill Stack is an expert flight simmer, the author of numerous training manuals for flight simulation computer programs and the owner of Training Associates in the USA. Training Associates publishes and distributes reference and self-learning books about flight simulation and other subjects. The books that cover various flight sim subjects are: Flight-Sim Pilot's Information Manual 1999 Instrument Flying for Flight-Simulation Pilots Flight Sim Navigation Flight Sim Maneuvers and others.... All these great books can be obtained by visiting The Training Associates website at www.topskills.com Nels Anderson, technical advisor for these tutorials, is a general aviation pilot and president of www.flightsim.com

DON'T TAKE OFF WITHOUT IT!

Flight simulation is the most enthralling and challenging ways one can use one's PC. As you can see the genre offers a bewildering array of products and ways of spending your time and money. PC Pilot is a new magazine to help you decide how and what you spend your time and money on. We have tried to inform, educate and help you get more from your simulated flights and will continue to do so as we publish future editions.

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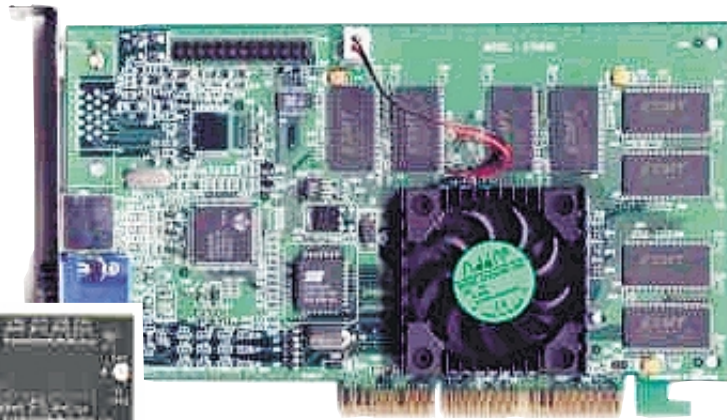
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OK, Pick a Card, any Card...

Creative Labs Ultra TNT2 vs Voodoo3 3000



As Autumn falls, Mother Nature keeps her promise, bringing changes in weather to the woods and fields of England. As the animals and birds alter their habits to survive it seems the 3D graphics card manufacturers follow suit.

3dfx and nVidia are once again leading the charge, each proclaiming as loudly as the other: "Our way is better than theirs". PC Pilot looks at both

to see which is best for flight simmers.

THE TESTING GROUNDS

Each board was tested within Microsoft Flight Simulator 98 utilising several test flight videos developed by PC Pilot. The flights incorporated a balanced dose of both default planes and scenery along with some third party files. This provided an excellent presentation of raw performance data compared to the somewhat simplistic default scenarios.

INSTALLATION

Installation of video cards has become wonderfully easy in the past year or so and these cards are no exception. With clear instruction manuals and some extra goodies on the installation CDs (like DirectX 6.1), no problems are likely to occur.

The best way to avoid any issues at all when replacing your video card is to first install standard VGA drivers (through the control panel)

before shutting down your PC and physically installing the new board.

3dfx's installation software was quite unique. It automatically scans your system and determines what steps in the installation process are needed or possible – something we found to refreshingly helpful.

Creative Labs' used a more conventional installation process, but nonetheless it was straightforward and easy. There was only the slight aggravation of performing two driver installations to get 3D recognition within Windows.

After setting the desktop resolution to 800 x 600 and 16 bit colour, it was time to see if 32 MB vs. 16 MB would make as much a difference as the leap from 8MB to 16MB has done previous graphics cards tests.

VISUAL QUALITY - PANELS

Within seconds one thing was very apparent; our eyes were no longer struggling to interpret tiny gauge readouts that seem common with today's add-on panels. Cockpit

THE CONTENDERS

Creative Labs TNT2

Creative Labs TNT2nVidia TNT2 Chipset
AGP 2X/4X Interface
32MB SDRAM
150MHz Core/183MHz Memory
300 million pixels/sec
9 million triangles/sec
300MHz RAMDAC

Voodoo3 3000 3dfx

Voodoo3 Chipset
AGP 2X Interface (no texturing)
16MB SDRAM
166 MHz Core/166MHz Memory
333 million pixels/sec
7 million triangles/sec
350MHz RAMDAC

displays had just taken a leap forward, with improvements in digital readouts, panel lettering, needles, colour contrasts and overall vibrancy of the displays. Overall, the Voodoo3 gave a slightly clearer image of nearly every panel tested.

Some rather interesting, yet mostly annoying anomalies appeared from time to time with the TNT2; using both Creative Lab's drivers and the 1.88 nVidia drivers at 1024x768 resolution presented quite a problem: view swaps were simply a royal pain

Creative Labs UltraTNT2 (1152 X 864)

Test 1	47.0 / 56.7
Test 2	14.6 / 26.25
Test 3	18.5 / 41.4
Test 4	37.0 / 40.3

3dfx Voodoo3 3000 Voodoo3 (1152 X 864)

Test 1	47.3 / 56.6
Test 2	9.1 / 20.0
Test 3	11.7 / 38.3
Test 4	40.7 / 47.6

The Tests:

- 1) A simple flight pattern with the Cessna 182 at Hartford Brainard airport using David Lang's Northeast scenery.
- 2) An intensive flight using the default 737-400, Chris Gilbert's O'Hare scenery and dynamic aircraft.
- 3) A Boeing 757 and Eric Ernst's 6.4 panel with Aaron Seymour's Los Angeles airport area scenery, a flight from Ontario to Los Angeles, runway 7L.
- 4) A DC-9 flight from JFK around Manhattan and back to JFK at night.

The first number indicates the frame rate displayed whilst sitting on the runway at the various airports from the cockpit (panel displayed). The second number is the average frames per second during the entire flight test.

Each test was conducted three times and then averaged.

PC PILOT RATINGS

Install Rating:

Voodoo3 3000	5
Creative Labs Ultra TNT2	4

Visual Quality Rating – Panels:

Voodoo3 3000	5
Creative Labs Ultra TNT2	3

Visual Quality Rating – Scenery:

Voodoo3 3000	5
Creative Labs Ultra TNT2	4

Frame Rate Test:

Voodoo3 3000	4
Creative Labs Ultra TNT2	5

Overall Rating:

Voodoo3 3000	5
Creative Labs Ultra TNT2	4

can only hope the next batch will put this right.

VISUAL QUALITY - SCENERY

Much of the scenery used day to day seems to be third party freeware or commercial add-ons, rather than default Microsoft scenery. We were quite pleased with the enhancements these next generation cards provide.

Distant objects pop up sooner and certainly with increased clarity over TNT, Voodoo Banshee, or Voodoo2 based boards. Problems were non-existent in this area, though once again we thought the Voodoo3's sharp display was slightly better than the Ultra.

PERFORMANCE & FRAME RATES

For the most part, both test cards are lightning fast, regardless of screen resolution. Only the aforementioned trouble with the Ultra and driver shipped with the card was there an issue, and that was only at 1024 X 768. Again, the later nVidia drivers cured this. The moral is always check the manufacturer's website for the latest drivers even if you card is brand new!

With these cards one can now enjoy 1152 X 864 resolution within Flight Simulator 98 and Combat Flight Simulator with nearly no performance penalty over the lower setting. Even 1280 X 960 and 1280 X 1024 are available (if your monitor handles those). Only slight visual improvements were noticed at 1280 on a 17" screen, so unless you use a 19" monitor, these resolutions may not be important to you.

It is a common myth that, because the eye can't discern anything over 30 fps (frames per second), any improvement is wasted on a computer screen. Believe us there is a quite noticeable difference between 30 fps and 80 fps.

This is the only category where the Ultra TNT2 comes out on top, most likely due to its faster memory speeds. One could conclude that 32MB of memory, though sounding very inviting and great for boasting rights actually does not matter when other features are implemented properly as one can see from the very close results above.

CONCLUSION

While visual quality will definitely improve, frame rate increases will depend on the type and speed of your CPU and the video board being replaced. For example, other cards we use come close in performance. However, a Voodoo 2 gets lost in the dust when matched up against these two powerhouses.

To get the best from either of these cards we would recommend a CPU speed at least, 64 MB RAM and an AGP slot motherboard. Naturally a 17" monitor will allow you to exploit the higher resolutions offered.

In this test the Voodoo3 3000 just edged out the Creative Labs Ultra TNT2 in all round appeal. Another point worth mentioning is the 2D Windows display of the 3dfx board, which is slightly sharper than nVidia's. Nonetheless, both are excellent choices and if and when nVidia can tweak it's drivers, the ratings could possibly perform a one-eighty turn.

TIPS & TRICKS



Hardware Eagle, Greg Gott, provides two simple (and free!) tricks for getting more from your PC.

DRIVE FASTER AND HARDER

Two of the most useful programs Microsoft has provided Windows users is Scansisk and Disk Defragmenter.

While ScanDisk will check and repair hard drive errors and weaknesses, defragging your system can, in some cases, dramatically increase your systems performance. Over time, information stored on your hard disc can become fragmented; meaning files are stored in non-contiguous sectors. Because it takes extra time to read and write fragmented files than unfragmented, your computer's performance suffers.

To run ScanDisk, click the Start button, click Run, and type 'scandisk' in the window. This program should be run weekly.

Defragging needs can vary, depending on how often you add and delete files. Businesses might need a weekly treatment, while an annual defrag would suit a casual home user. Run this program by first shutting off screen savers and any energy saving features, then click on Start, click Run, and type "defrag". Next, head down to your favourite (real) airport to watch planes come and go; defragging can take several hours.

SPEED UP FLIGHT SIMULATOR AND SAVE SPACE

If you are tired of the Microsoft splash screen that runs every time Flight Simulator 98 launches, simply use Windows Explorer to navigate to your main Flight Simulator 98 folder and delete the file named "mslogo.avi". Besides speeding up the launch time, you will gain 2.04MB on your hard drive. The file is available on the Flight Simulator 98 CD if a re-install is desired.

Glossary

The world of aviation seems blessed with a bewildering array of acronyms. The following we hope will prove a handy reference guide to some of the more widely used terms.

A

ACARS - Aircraft Communication Addressing and Reporting System.
ADF - Automatic Direction Finder/Finding.
ADI - Attitude Deviation Indicator.
ADR - Accident Data Recorder.
AFCs - Automatic Flight Control System (an advanced autopilot).
AFIS - Aerodrome Flight Information Service.
AGL - Above Ground Level.
AHRS - Attitude-Heading Reference System
AIS - Aeronautical Information Service. CAA unit based at London-Heathrow Airport, providing flight-planning services and information for pilots.
AIZ - Aerodrome Information Zone.
AOPA - Aircraft Owners and Pilots Association.
AP - Airport or Autopilot.
APP - Approach (control).
APU - Auxiliary Power Unit.
ASI - Airspeed Indicator.
ASR - Altimeter Setting Region.
ATC - Air Traffic Control.
ATIS - Automatic Terminal Information Service.

B

BRG - Bearing.

C

CAA - Civil Aviation Authority - the UK aviation regulatory organisation.
CAS - Calibrated Airspeed.
CAT - Clear-Air Turbulence.
CDI - Course Deviation Indicator.
CDU - Control Display Unit.
CH - Compass Heading.
CHT - Cylinder Head Temperature (a cockpit gauge).
C/L - Centre-Line (of a runway, for example).
Clouds - commonly-used abbreviations for cloud types:-
* AC - *altocumulus*
* AS - *altostratus*
* CB - *cumulonimbus*
* CC - *cirrocumulus*
* CI - *cirrus*
* CS - *cirrostratus*
* CU - *cumulus*
* NS - *nimbo stratus*
* SC - *stratocumulus*
* ST - *stratus*

CRT - Cathode Ray Tube (television monitor).
CRS - Course.
CSU - Constant-Speed Unit.
CTA - Control Area.
CTR - Control Zone.
CVR - Cockpit Voice Recorder.
CZ - Control Zone (USA).

D

DF - Direction-Finding.
DH - Decision Height.
DI - Direction Indicator.
DME - Distance-Measuring Equipment.

E

EADI - Electronic Attitude Director Indicator.
ECU - Environmental Control Unit.
EFAS - Electronic Flash Approach Light System.
EFIS - Electronic Flight Instrument System.
EGT - Exhaust Gas Temperature (a cockpit gauge).
EHSI - Electronic Horizontal Situation Indicator.
EICAS - Engine Indicating and Crew Alerting System.
ELT - Emergency Locator Transmitter.

F

FAA - Federal Aviation Administration, USA equivalent of UK CAA.
FADEC - Full-Authority Digital Engine Control.
FAF - Final Approach Fix.
FDR - Flight Data Recorder more popularly known as the 'black box'.
FL - Flight Level.
FMS - Flight Management System. Also referred to as FMC (Flight Management Computer)

G

GCA - Ground-Controlled Approach
GNSS - Global Navigation Satellite Systems.
GPS - Global Positioning System (Navstar).
GPWS - Ground Proximity Warning System.
GS - Glideslope.
G/S - Groundspeed.

H

HDG - Heading.
HF - High-Frequency band.
HSI - Horizontal Situation Indicator.
HUD - Head-Up Display.

I

IAS - Indicated Airspeed.
ICAO - International Civil Aviation Organisation (responsible for the codes for airports amongst other things).
IFCS - Integrated Flight Control System.
IFR - Instrument Flight Rules.
IGS - Instrument Guidance System.
ILS - Instrument Landing System.
INS - Inertial Navigation System.
IR - Instrument Rating.
ISA - International Standard Atmosphere.
ITT - Inter-Turbine Temperature.

J

K

KHz - Kilohertz.
Kt - **Knot** - one nautical mile per hour. One knot equals 1.1515 mph.
kW - Kilowatt.

L

LARS - Lower Airspace Radar Advisory Service.
LAT - Latitude.
LDA - Landing Distance Available.
LF - Low Frequency - radio waves with frequencies in the 30-300 kHz band.
LITAS - Low-Intensity Two-colour Approach System.
LOC - Localiser.
LON(G) - Longitude.

M

M or **MAG** - Magnetic.
Mach - Ratio of true airspeed to the speed of sound. Mach 1 = 1,100 feet per second or 760 mph.
MAP - Missed Approach Point.
MB - Millibar.
MDA - Minimum Descent Altitude.
MDH - Minimum Descent Height (above ground level).
MET - meteorology, weather.
METAR - Coded aerodrome MET report.
MF - Medium Frequency.
MFD - Multi-Function Display.

MH - Magnetic Heading.
MHz - Megahertz.
MLS - Microwave Landing System.
MSA - Minimum Safe altitude.
MSL - Mean Sea Level
MTOW - Maximum Take Off Weight (less total usable fuel in applicable aircraft).

N

NATS - National Air Traffic Services.
NDB - Non- Directional Beacon.
NM - Nautical Mile.
NOTAM - Notices to Airmen.

O

OAT - Outside Air Temperature.
OBS - Omni-Bearing Selector, used to select the radial from a VOR.

P

PAPI - Precision Approach Path Indicator.
PAR - Precision Approach Radar.
PIC - Pilot-In-Command.
PIO - Pilot-Induced Oscillation.
PLN - Flight-Plan.
PMS - Performance Management System.
POB - Persons On Board. See also SOB.
POH - Pilot's Operating Handbook, an aircraft's 'owner's manual'.
Pooley's - Flight guide to the United Kingdom and Ireland, published annually.
PPL - Private Pilot's Licence.
PTT - Press-To-Transmit.

Q

ODM - Magnetic bearing to a direction-finding station.
QDR - Magnetic bearing from the station.
QFE - Atmospheric pressure at aerodrome elevation.
OFU - Magnetic orientation of runway in use.
QNE - Reading in feet on an altimeter set to 1013.
ONH - Altitude above mean sea level based on local station pressure.
QTE - True line of position from a direction-finding station.
QUJ - True bearing.

R

RAS - Radar Advisory Service.
RCL - Runway Centre-Line.
RBI - Relative Bearing Indicator, displaying information from the ADF.
RDO - Radio.
RIS - Radar Information Service.
RMI - Radio Magnetic Indicator.
RMU - Radio Management Unit.
RVR - Runway Visual Range.
RWY - Runway.
RX - Receiver.

S

SAS - Stability Augmentation System.
SB - Service Bulletin.
SELCAL - Selective Calling.
SFC - Specific Fuel Consumption.
SID - Standard Instrument Departure.
SOB - Souls On Board (see also POB).
SOP - Standard Operating Procedure.
SR - Sunrise.
SRZ - Special Rules Zone.
SRA - Surveillance Radar Approach.
SRE - Surveillance Radar Element of a GCA.
SS - Sunset.

SSB - Single sideband.
SSR - Secondary surveillance radar.
STAR - Standard Terminal Arrival Route, for inbound IFR traffic.
STOL - Short take-off and landing.

T

TACAN - Tactical Air Navigation System.
TAF - Terminal Area Forecast.
TAS - True Air speed.
TCA - Terminal Control Area (USA).
TCAS - Traffic Alert and Collision Avoidance System.
THR or **Thld.** - Threshold.
TMA - Terminal Control Area (UK)
TO - Take- Off (sometimes TKOF).
TODA - Take- Off Distance Available.
TODR - Take- Off Distance Required
TORA - Take- Off Run Available.
TSD - Technical Standard Order.
TVOR - Terminal VOR.
TWR - Tower (aerodrome control tower).
TWY - Taxiway.
TX - Transmitter.

U

UDF - UHF Direction Finding.
UHF - Ultra-High Frequency.
UIR - Upper Information Region.
UTC - Co-ordinated Universal Time, (Greenwich Mean Time)

V

VAL - Visual Approach and Landing (chart).
VAR - Variation (magnetic)
VASIS - Visual Approach Slope Indicator System.
VDF - Very-High Frequency Direction-Finding.
VFR - Visual Flight Rules.
VHF - Very H igh Frequency.
VIS - Visibility.
VLF - Very Low Frequency.
VOLMET - Continuous recorded broadcasts of weather conditions.
VOR - Very high frequency Omni-directional Range.
VP - Variable-Pitch (propeller).
VRP - Visual Reporting Point.
VSI - Vertical Speed Indicator.

W

WP - Waypoint.
WX NIL - No significant weather, term used in Met reports.

X

XMSN - Transmission.
XPDR - Transponder.

Y

Z

ZFW - **Zero-Fuel Weight** - maximum permissible weight of an aircraft.
ZULU or **Z** - Used worldwide for times of flight operations (same as UTC).

Product Listings

In the first of regular series, we round up a comprehensive selection of flight simulation hardware and software.

This first issue we focus on sticks, yokes, pedals and expansions for Microsoft Combat Flight Simulator and Flight Simulator 98.

CONTROL PANELS & COCKPIT SYSTEMS		
Product	Publisher/Distributor	Price (RRP)
Optivision Visual Display System	RC Simulations	£2,999.95
Masterpilot & Programming Adaptor	RC Simulations	£69.95
Copy Cat Helicopter Multi-Role Virtual Controls (MRVS)	RC Simulations	£549.95
Copycat Controls (Aircraft Style)	RC Simulations	£1,999.95
Pro Quality Fresnel Lense & Fittings	RC Simulations	£99.95

FLIGHT YOKES		
Product	Publisher/Distributor	Price (RRP)
CH Virtual Pilot Yoke	Virtual Reality	£89.95
CH USB Flight SimYoke (Three Levers)	Virtual Reality	£149.95
CH USB Flight SimYoke LE	Virtual Reality	£119.95
CH Flight Sim Yoke PC	Virtual Reality	£104.95

JOYSTICKS AND THROTTLES		
Product	Publisher/Distributor	Price (RRP)
CH Flightstick	Virtual Reality	£29.95
CH Flightstick Pro	Virtual Reality	£29.95
CH Mach 1 Joystick	Virtual Reality	£19.95
CH Mach 1 Plus Joystick	Virtual Reality	£24.95
CH Janes F16 Combat Stick	Virtual Reality	£69.95
CH Mach 3 Joystick	Virtual Reality	£34.95
CH Jetstick	Virtual Reality	£19.95
CH Gamestick PC Analogue	Virtual Reality	£34.95
CH Gamestick 3D USB	Virtual Reality	£64.95
CH F16 Flight Stick	Virtual Reality	£49.95
CH F16 Combat Stick	Virtual Reality	£76.95
CH F16 Fighter Stick	Virtual Reality	£119.95
CH Force FX (Force Feedback Joystick)	Virtual Reality	£129.95
CH USB F16 Combatstick	Virtual Reality	£99.95
CH Pro Throttle	Virtual Reality	£119.95
Thrustmaster Attack Throttle	RC Simulations	£39.99
CH Gamepad PC	Virtual Reality	£24.95
CH Gamepad USB (Clear or Black)	Virtual Reality	£36.95
CH Gamestick for Playstation PSX	Virtual Reality	£71.95
CH Racing Wheel Virtual Reality		£24.95
CH Joystick Switchbox	Virtual Reality	£32.95
CH Gamecard 3	Virtual Reality	£34.95
CH Trackball Pro (PS2 or Serial)	Virtual Reality	£89.95
CH X Cable (Extension Cable)	Virtual Reality	£11.95
CH EXL500 Race System	Virtual Reality	£71.95
Cyborg 2000 Joystick	Saitek	£39.99
Cyborg 3D Stick	Saitek	£49.95
Cyborg 3D Stick USB PC	Saitek	£49.99
F16 FLCs Joystick PC	Thrustmaster	£129.95
TQS/ F-16 Throttle PC	Thrustmaster	£129.95
Wingman Extreme Digital Joystick PC	Logitech	† \$39.99
X-32 Pistol Grip Joystick PC	Saitek	† \$14.99
X-Fighter Flight Stick PC	Thrustmaster	† \$44.99
X1-30 Mini Arcade Stick PC	Saitek	\$9.99
X7-34 Supreme Flight Joystick PC	Saitek	\$19.99
XL Action Controller PC	Thrustmaster	\$34.00

PEDALS		
Product	Publisher/Distributor	Price (RRP)
CH Pro Rudder Pedals PC	Virtual Reality	£99.95
CH Pedals	Virtual Reality	£53.95
Thrustmaster Elite Rudder Pedals	RC Simulations	£59.95
CH Pro Rudders USB	Virtual Reality	TBA
CH Pedals USB	Virtual Reality	TBA
MRVC Rudder Pedals	RC Simulations	£119.95
Cirrus Rudder Pedal Set PC	Precision Flight Controls	\$384.99
SIMPED-Vario Pedals PC	Hofmann Electronics	\$139.99

COMBAT FLIGHT SIMULATOR EXPANSIONS				
Developer	Publisher/Distributor	Product	Price (RRP)	PC Pilot Rating
Associates	Associates	Combat Pilot No.1 (Attack) Sqd.	£19.99	4
Associates	Associates	The Luftwaffe Collection	£24.99	5
Abacus	Contact Sales	Flight Deck Blue Angels	£29.99	3
Abacus	Contact Sales	Pacific Theatre Aircraft	£29.99	4
Abacus	Contact Sales	Wings Over China	£24.99	Not released
Abacus	Contact Sales	Tuskegee Fighters	£24.99	Not released
Wilco	Associates	Grand Canyon Scenery	£24.99	4

Flight Simulator Add-ons overleaf . . .



The Product Listings section is kindly sponsored by RC Simulations, the UK's leading supplier of flight simulation equipment and software.

RC are one of the oldest established flight sim companies and offer a friendly, expert service.

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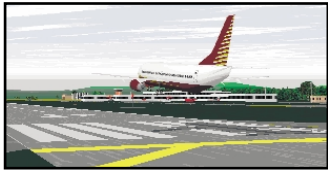
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MICROSOFT FLIGHT SIMULATOR 98 EXPANSIONS				
Developer	Publisher/Distributor	Product	Price (RRP)	PC Pilot Rating
Abacus	Contact Sales	Flight Deck Blue Angels	£29.99	3
Abacus	Contact Sales	Dangerous Airports	£29.99	2
Abacus	Contact Sales	Airport & Scenery Designer V2.0	£34.99	4
Abacus	Contact Sales	Co Pilot 2	£34.99	3
Abacus	Contact Sales	Aircraft Factory 99	£34.99	4
Abacus	Contact Sales	Instant Airplane Maker	£29.99	4
Abacus	Contact Sales	Custom Panel Designer	TBA	Await review
Abacus	Contact Sales	Aircraft Animator	TBA	Await review
Abacus	Contact Sales	FS Flightbag	£19.99	3
Aerosoft	Associates	German Airports 3	£24.99	4
Aerosoft	Associates	Scenery Designer	£29.99	3
AETI	RC Simulations	AETI 737 Aircraft & Panel	£14.99	2
AETI	RC Simulations	The Next Generation Aircraft	£14.99	3
AETI	RC Simulations	AETI MD-83 Aircraft & Panel	£24.99	3
AETI	Associates	ProFlight	£34.99	5
AETI	RC Simulations	The Jet Age	£19.99	2
Alting	Associates	Europe 1 Pro	£34.99	4
Alting	Associates	Europe 2 (France, Belgium, Luxembourg & Corsica)	£29.99	3
Alting	Associates	Europe 3 (England & Wales)	£29.99	3
Alting	RC Simulations	Azores & Maderia	£34.99	2
Apollo	RC Simulations	FSWOW Airport Wizard	£34.99	3
Apollo	RC Simulations	Object & Scenery Designer	£34.99	4
Apollo	RC Simulations	First Class Boeing 747-400 Glass Cockpit	£34.99	4
Apollo	RC Simulations	Adventure 2000	£39.99	Await review
Wilco	Associates	Grand Canyon Scenery	£24.99	4
Lago	Associates	Japanese Aircraft Collection	£9.99	3
Associates	Associates	Himalayas Scenery	£9.99	3
Aerosoft	Associates	California Adventure Collection	£24.99	3
Associates	Associates	Sri Lanka Scenery	£9.99	2
Associates	Associates	Singapore Scenery	£9.99	3
Wilco	Associates	Airport 2000	£29.99	4
Lago	Associates	Italy'98 Scenery	£29.99	3
Associates	Associates	Australia Scenery	£19.99	2
Associates	Associates	Scenery Venice	£9.99	3
Flight One	Associates	747-400	£19.99	4
Associates	Associates	Scenery Vienna	£9.99	3
Flight One	Associates	FS Clouds & Textures Pro for FS98	£29.99	4
Flight One	Associates	Flight Director'99 Pro	£29.99	4
Colorado	Associates	Navigator 6	£19.99	3
Lago	Associates	Winplanner Plus	£34.99	3
Flight One	Associates	Legendary Aircraft Collection/Suite	£19.99	4
VIP	Associates	VIP Classic Airliners	£24.99	4
Pilots	Associates	Tupolev TU-154	£19.99	2
Flight One	Associates	FS Weather	£19.90	3
Pilots	Associates	Airbus 2000	£24.99	3
Associates	Associates	Concorde SST	£24.99	4
VIP	Associates	VIP Ultimate Classic Wings	£29.99	4
Associates	Associates	DC-3	£9.99	4
Lago	Associates	Cleared to Land	£19.99	3
Associates	Associates	RAF Collection	£24.99	3
Rodolfo Arata	Lago	Mad Dog	£34.99	4
VIP	Associates	VIP Classic Wings 98	£19.99	4
Aerosoft	Associates	Airline Flights (Airline Adventures)	£9.99	2
Aerosoft	Associates	Airline Flights 2	£29.99	2
Data Becker	Data Becker	African Safari Scenery	£19.99	3
Data Becker	Data Becker	Special Air Mission	£19.99	2
Data Becker	Data Becker	747	£19.99	2
FlightSoft	RC Simulations	Tribute to the DC-10	£29.99	3
Take 2	Take 2	Great Britain Part 3 (Wales, North & Southern England)	£19.99	2
Instant Access	Associates	Perfect Flight Deluxe Great Britain/Ireland	£24.99	3
Pilots	Associates	FS Global Upgrade	£34.99	3
Instant Access	Associates	Hong Kong'99	£19.99	3
Mailsoft	RC Simulations	Balaeric Islands Scenery	£29.95	2
Mailsoft	RC Simulations	Hungary, Slovakia and Czech Republic	£29.95	3
Mailsoft	RC Simulations	Scandinavia	£29.95	3
Mailsoft	RC Simulations	Turkey & Cyprus	£29.95	2
Mailsoft	RC Simulations	Airport Zurich-Kloten	£29.95	Await review
Mailsoft	RC Simulations	Swiss Military 2000	£29.95	Await review
Mailsoft	RC Simulations	Greece Scenery	£29.95	2
Papa Tango	Papa Tango	EFIS'98	£39.99	4
Lago	Papa Tango	The Triangle	£34.99	3
Papa Tango	Papa Tango	Airfield	£34.99	1
Papa Tango	Papa Tango	Flight Academy'98	£34.99	2
Papa Tango	Papa Tango	Fly Lauda	£34.95	Not released
Papa Tango	Papa Tango	Real ATC	£39.99	4
PC Aviator	RC Simulations	Megascenery Downunder	£39.95	3
PC Aviator	RC Simulations	Pacific Northwest Megascenery	£39.95	3
Pilots	RC Simulations	Pilots Russian Multimedia Collection	£9.95	3
Take 2	Take 2	Mayday! Mayday!	£24.99	2
Technic Direct	RC Simulations	HQ Aircraft Collection 98	£29.99	2
Technic Direct	RC Simulations	HQ Aircraft Collection 2	£29.99	3
Wilco	Associates	Tahiti Scenery	£24.99	3
Associates	Associates	Aces High	£24.99	3
Associates	Associates	The Luftwaffe Collection	£24.99	5

The 6th Annual Show Dedicated To European Flight Simmers

Saturday 4th December 1999, 10am- 5pm.
The National Motorcycle Museum (off M42, by NEC), Birmingham, UK.

RC Simulations, one of the UK's oldest flight simulation specialists, have announced the dates of their sixth annual exhibition. This is the only show in the UK dedicated to flight simulation.

The exhibition first started in 1994 in conjunction with the UK Flight Simulator User Group. It is now a much larger event attracting companies from all over the world.

Visitors will be able to try everything from virtual reality programmable joysticks to a complete cockpit system. Test your ability to handle the fastest fighting jets, land an airliner or simply "fly" a light aircraft. It is a great opportunity to meet the experts and companies that design and make your flight simulation experiences realistic.

RC already has a wide variety of companies exhibiting. Microsoft

will be demonstrating Flight Simulator 2000 – a good opportunity to take a test flight if you hadn't been tempted to purchase it by then. The worlds biggest add-on publishers, The Associates, are also promising to have "goody" bags for visitors and hope to have Airline Simulator 2 available for a hands-on experience in a large cockpit. Other exhibitors will include the Flight Simulator User Group, CH Products, Papa

PC Pilot readers can order advance tickets for a £1 discount per ticket – write directly to RC Simulations below!

Tango, Abacus plus no doubt more "unconfirmed" companies.

Ticket prices are £6 for adults, £5 for under 16s. Children under 5 are free.

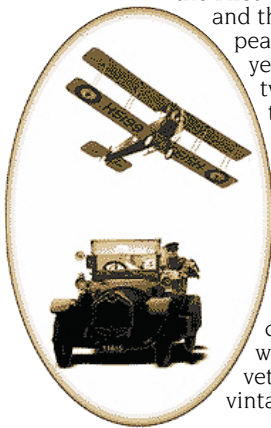
Contact: RC Simulations, The Hangars, Bristol Airport, Lulsgate, Bristol, BS48 3EP, United Kingdom. Tel: 01275 474550 Fax: 01275 474855 Email: CFS99@rcsimulations.com

Major U.K. Airshows

Autumn Air Day by the Shuttleworth Collection

Sunday 3rd October 1999.
Old Warden Aerodrome, near Biggleswade, Bedfordshire.

The collection is famous for its regular flying displays. During the season, all of the airworthy aircraft are flown in displays, alongside visiting aircraft from other operators and from other Services, re-creating flying during the Edwardian period,



the First World War and the peacetime years of the twenties and thirties. Modern aircraft are also a regular feature and provide an intriguing contrast with the veteran and vintage types.

Ticket prices: £9-22.00 depending on number of people in car. Coach passenger, pedestrian and cyclist £6.00. Students and children £3.00

Contact: 24 hour information hotline 0891 323310. Website: www.shuttleworth.org

The 1999 Duxford Autumn Airshow

Sunday 17th October.
Duxford Aerodrome, Duxford, Cambridgeshire. Off junction 10 of the M11.



The UK's last major airshow of the Millennium, this event will feature an outstanding array of Duxford-based historic aircraft. Includes the classic Second World War fighters like the Spitfire, the Hurricane, the majestic Bristol Blenheim and the post-war jet fighter, the Hawker Hunter.

Ticket prices: adult £12.00, senior citizens £10.00 and concessions £6.00. Children free if accompanied by an adult.

Contact: Telephone 01223 835000. Website: www.iwm.org.uk

Other UK Aviation Events:

- October:**
- 9th** Kemble, Gloucestershire - Autumn Flying Day
 - 10th** Popham, Hampshire - End of Season Fly-in
 - 10th** Weston-super-Mare, Somerset - International Helicopter Museum Open Cockpit Day
 - 24th** Brighton, North Yorkshire - Pre-Hibernation Fly-in

November:

- 7th** North Weald (Essex) - The Squadron Autumn Fly-in

Flight Simulator Contest in Belgium

Saturday October 30th, 8am-11pm and Sunday October 31st 1999, 9am to 3.30pm.

EuroVolleyCenter, Beneluxlaan 22, B-1800 Vilvoorde, Belgium

Following on from a similar event in March this year, teams from all over Europe will compete in a fly-in organised by the Belgian Flight Simulator Club. Contestants will have to cope with thunderstorms, turbulence, leaking fuel tanks, Swahili-speaking Air Traffic Control and of course fog, fear and fatigue. They will compete for a winners-cup either in their home-made cockpits or PCs.



Contact: Belgain Flight Simulator Club, Glasgowstraat 5, B-2030 Antwerpen, Belgium. Telephone/fax: +32 (0)3 5420588. Website: <http://fly.to/fscb>

USA Aviation Events:

October:

- 1st - 3rd** Cullman, AL - 5th Annual North Alabama Rotorcraft Fly-in
- 2nd - 3rd** Sidney, NY - Fagan Flyers Octoberfest Fly-In breakfast
- 2nd -3rd** Sioux City, IA - Mid America Airshow
- 9th** Rio Hondo, TX - Texas Air Museum Fly-In and waffle breakfast
- 14th -16th** Abilene, TX - 35th annual EAA Southwest Regional Fly-In
- 15th - 17th** Inyokem, CA - Ridgecrest /Inyokem Airshow & Balloon Festival
- 19th - 21st** San Francisco, CA - SAE World Aviation Conference. Airport Hyatt.
- 21st - 23rd** Atlantic City, NJ - AOPA Expo '99
- 22nd -24th** St Louis, MO - 9th Annual Biennial Conference of Historic Aviation Writers



- 23rd** Archer, FL - EAA Chapter 98 and Kitty Hawke Aviation Fifth Annual Fall Air Festival
- 29th - 30th** St. Petersburg, FL - Florida 400 Air Race

November:

- 6th** Granbury, TX - EAA Chapter 983 Fall Fly-In and Bratwurst Lunch.

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Aces High – This comprehensive WWI expansion environment provides the history, the scenery, sounds and atmosphere of the great aces and their flying machines.
RRP £24.99



ProFlight – “Proflight is easily the best MSFS add-on to date. Anyone serious about flight sims should get this” PC Gaming World 5 Star award winner September 1999.
RRP £34.99



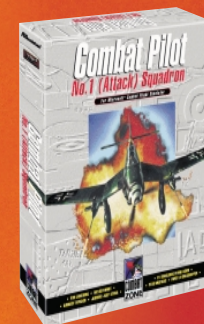
Airbus 2000 – Over 50 detailed airliners with authentic panels and sounds – Airbus Industrie are manufacturers of the finest passenger and cargo aircraft in the world. Celebrate the worldwide success of Airbus with this, the ultimate Airbus fleet for Microsoft Flight Simulator.
RRP £24.99



747-400 – Designed by Flight One Software, the creators of the awesome FS Clouds and Flight Director products, this is one aircraft pack that you will not want to miss. This comprehensive product is based on the latest generation of aircraft design technology and beats all imitators hands down!
RRP £19.99



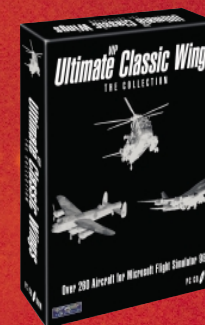
Luftwaffe Collection – The most significant aircraft from Germany's military history have been recreated in perfect detail for Flight Simulator and Combat Flight Simulator. Probably one of the finest military collections ever assembled!
RRP £24.99



Combat Pilot – Use these 7 new aircraft in 14 different liveries in new campaigns, quick combat or missions to experience the greatest moments of aerial combat from World War II. Each aircraft is designed with the very latest Combat Flight Simulator technology available exclusively from Flight Sim Developers.
RRP £19.99



Classic Airliners - The Kings of the Sky return once more with the finest collection of airliners from early 1940 to 1980. Re-live the wonderful days of air travel piloting the first wave of luxurious airliners or the early days of affordable air travel for all. This collection of classic airliners has been finely detailed for Flight Simulator – each aircraft is both a joy to behold and a delight to fly.
RRP £24.99



Ultimate Classic Wings – The Kings of the Sky have excelled themselves once more! VIP have followed up their best selling VIP Classic Wings 98 with a whole new collection in the biggest and best aircraft collection EVER SEEN!
RRP £29.99



Legendary Aircraft Collection – The Legendary Aircraft Collection represents a combination of quality, variety and superb value. Over 200 beautifully rendered editions of more than 100 unique aircraft are included. Every aircraft's flight dynamics model is optimised specifically for Flight Simulator and Combat Flight Simulator to deliver each aircraft's maximum 'real feel'
RRP £19.99

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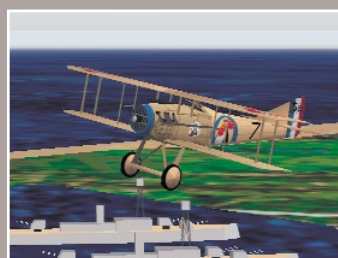
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...Real Simulation



The MD-83 Captain's panel on climb out...



MD-83 centre panel with comms, autopilot and engine read-outs.



The Boeing 747-400 Captain's view at Zurich with 'glass cockpit' panel.



The Boeing 747-400 centre panel view shows important information clearly.

- Developed by real airline pilots and aviation professionals over three years.
- The most realistic aircraft handling ever achieved on a PC-based flight simulation with all new flight models of MD-83, MD-88 and B747-400 aircraft. Plus additional aircraft, including B737, B767, B747-357, A320 and Shorts 360.
- Vast scenery base with enhanced 256 colour Europe and North Atlantic scenery over 1,600 airfields covered in detail! USA Continental scenery now included too!
- Highly sophisticated flight equations based on true inertia systems and detailed airflow calculations and forces programmed with accuracy up to FL500!
- Wind turbulence, rain and snow as well as runway surface calculations allow realistic ground handling.
- Explore the edges of the aircraft flight envelope... You deal with asymmetric lift, asymmetric drag, flamed out engines and much more.
- Aircraft Abstraction Layer (AAL), the technology behind the new flight model, makes flying easy and teaches the right real world handling techniques used by real world pilots.
- Autopilot, Main Control Panel (MCP), Flight Management Computer (FMC), Thrust Computer, Ground Proximity Warning System (GPWS), Traffic and Collision Avoidance System (TCAS) and many more systems.
- Aural Alarms (e.g. GPWS, TCAS, configuration alarms), voice communication with the first officer and improved sounds for touch down, stall warning and other aircraft related sounds have been implemented using real world sounds.
- Fly with TRUE 3D! Red-green anaglyph glasses are included to let you take advantage of the 3D Advanced Graphics System module included.
- Multi-player flight simulation via IPX Network. Up to 4 planes can see each other with external visuals together with proper TCAS simulation. The included Scenery Viewer (called Ernie) allows you to view scenery and is useable as a radar screen for networked multi-player sessions.
- Comprehensive manual including 150 pages of authorised reproductions of Aerad airport and ILS charts. Further, 3 authorised reproductions of Aerad en-route charts covering Europe and North Atlantic are included as well as checklists for the MD-83, MD-88 and B747-400 aircraft.

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